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AMERICAN AND OTHER PATENTED INVENTIONS.

MAY, 1830.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN FEBRUARY, 1830.

With Remarks and Exemplifications, by the Editor.

1. For a *Mill for Preparing Bark* for tanning; Merrit Hurd, Augusta, Oneida county, New York, February 1.

A wooden cylinder turns upon gudgeons; this cylinder is furnished with rows of steel teeth set spirally round it. A bar of iron crosses the frame, and is placed so as just to clear the teeth of the cylinder. The bark is to be put into a hopper above the line of operation between the bar and cylinder. There is no claim whatever.

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2. For an improvement in the *Application of the Lever;* Benjamin Morris, Birmingham, Broome county, New York, February 2.

This *improvement in the application of the lever* is merely a rack and pinion press, not differing in the slightest particular from the well known modes of applying this power. In the drawing there are two wheels and two pinions, and we are told that the wheel to which the power is applied may be turned by an endless screw; by a pinion and lever; or by a rope acting upon its periphery by means of a windlass and lever.

The puzzling task of finding any thing in this machine to which to lay claim has very wisely been avoided.

3. For a machine for *Drilling Rocks for Blasting;* John W. Post, Washington City, and Calvin Post, Springport, Cayuga county, New York, February 2.

A frame is made, in the centre of which an iron shaft or rod is caused to rise and fall vertically between friction rollers so placed as to keep it in its position. In the lower end of this shaft a socket is formed to receive drills of different sizes. Provision is made for placing the machine vertically, by sliding pieces upon each of its four legs, which serve to lengthen them as may be necessary. The apparatus for working the shaft up and down is formed as follows: a circular plate of iron, about a foot in diameter, has a hole in its centre, provided with a socket adapted to the iron rod, or shaft, and capable of being secured at any part of it, so that the plate will stand horizontally. At a little distance from the periphery of this plate an iron spindle crosses the frame; upon this spindle are lifters, which, as it is turned by a crank, come in contact with the lower side of the plate, and raise the shaft; friction rollers are contained within the lifters, to cause them to slide easily upon the plate, and their action is so managed as to produce a small revolution of the plate, and consequently of the drill, at every lift.

The claim is to "the general principle contained in the foregoing description."

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4. For an improvement in *Forming the Nap upon Woollen Cloths;* Zachariah Allen, Providence, Rhode Island, Feb. 2. (See specification.)

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5. For a *Machine for Washing Clothes,* called the VIBRATING WASHING MACHINE; Samuel Silliman, Saybrook, Middlesex county, Connecticut, February 3.

A vibrating frame is supported by two uprights above a trough, or box, which is to contain the clothes and suds, "at the bottom of the vibrating frame are five wooden rollers of an inch and half diameter, one-fourth of an inch distant from each other, with iron, or other metallic arbors, or centres, at their ends, fitted to, and running in, boxes of pewter, or composition, and attached to the bottom of the side pieces. The line of the rollers conform to the sweep of the vibrating frame." A false bottom, consisting of fluted boards, and perforated with holes, is retained by ledges in a situation suited to the action of the rollers. The gudgeons of the vibrating frame work in a slot, or mortise, to enable it to adapt itself to the inequality in the thickness of the clothes; the false bottom also gives way, as there are no ledges below it, but it is forced up against those above it, by the water in which it floats. The vibrating frame is worked by a handle, which is affixed to one of the cross pieces which unite its two sides, and this handle is further secured by a brace extending to another cross piece. We mention these minute points, because they

appear to the inventor of great importance, as is evinced by the attention paid to them in the claim, which is as follows:—

"The wash board detached from the tub, perforated and raised from the bottom; the rollers attached to the vibrating frame, with metallic arbors and boxes in the manner described, aforesaid, with the slide of the frame in the mortises of the shaft, together with the handle placed as aforesaid, are claimed as an entirely new application in the washing machine." Unfortunately, nearly the whole of these entirely new applications, have been long known and used; the floating bottom may be new.

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6. For an improvement in and on *Package Pumps for Raising and Conducting Water* to any place desired; John A. Smith, Windham, Windham county, Connecticut, February 3.

When we hear of an improvement in pumps, our anticipations resemble those which would be raised by the possession of a lottery ticket, a prize is possible, but a blank is almost certain. We apprehend that on the present occasion, the patentee will find that his prize is like that of "2538" in the play.

What is meant by a *package pump*, we do not know, but let this pass, as our ignorance abstracts nothing from the value of an invention, we will therefore tell, as well as we can, how this pump is constructed, and enable our readers to form a judgment for themselves.

There are two barrels, the pistons of which are worked by racks and a pinion, in the manner of the double barrelled air pump; we are not so told, but it follows from their operation that they are to be lifting and forcing pumps, with their piston rods working through stuffing boxes. The first thing claimed as a new invention is the fixing the barrels over a box, or receiver, capable of containing a considerable portion of water. "The advantage of this receiver is to prevent the motion of the pistons pulling the stream in two, or causing friction, and affording a constant supply of water, so that when the valves lift, there will be no danger of forming a partial vacuum." This is all very good, though not very new, but, if the drawing furnished is to be our guide as regards the structure of this pump, we shall find the proposed good completely counteracted by the size of the shaft which is to descend into the well or fountain; and which is represented as a tube the section of which would be about equal to *one-twentieth* of one of the pump barrels.

The water is to be forced up a tube, extending to any height required, and to prevent the water from freezing in this tube, the patentee claims "to have invented the application of a *thief*, or a small outlet, taking the water out of the main pipe," and conducting it into a reservoir, or tub, from whence it may be conducted to a barn, shed, or other place where it may be wanted. Wherever water works have been established, we apprehend that *thieves* of this kind have been known and used; it is a common practice in Philadelphia

and elsewhere, to have such waste water tubes, to prevent the bursting of the pipes by frost.

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7. For an *Improvement in Steam Navigation generally;* John M. Patton, Milton, Northumberland county, Pennsylvania, February 4.

(See specification.)

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8. For an improved *Machine for Grinding Flax-seed, and other kinds of Grain,* paints, medicines, and other substances; Asahel Cross and Ezra Brown, Cazenovia, Madison county, New York, February 4.

(See specification.)

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9. For a *Double Revolving Churn;* Luther Barney and Abel A. Beach, Groton, Tompkins county, New York, February 5.

We believe that there is something new, at least, in this churn. It consists, in part, of a vertical tub, much in the form of the ordinary churn; this tub is fixed in a frame, and is supported upon pivots above and below its centre or axis, to allow it to revolve; a shaft passes through its top, and is surrounded by dashers, which consist of strips of wood set obliquely, and spirally, in the manner which has been frequently practised. A vertical cog wheel, turned by a crank, meshes at its upper side into a wheel upon the dasher, and at its lower into a wheel upon the top of the churn, causing both the shaft with the dashers, and the churn itself to revolve, but in opposite directions. There is no claim.

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10. For a machine for *Washing Clothes,* called the Revolving Steam Washer; Luther Barney and Abel A. Beach, Groton, Tompkins county, New York, February 5.

For what reason this is called a steam washer, does not appear. The machine consists of an oblong box hung by gudgeons on the middle of its sides, and turning upon them, by means of a crank, with the aid of a wheel and pinion. The gudgeons rest upon the edges of a second box, or trough, made large enough for the former to revolve in. To the first, or tight box, there is a cover which must be removed for admitting the clothes and suds; this, when replaced, must fit perfectly tight. Within the tight box are placed pins, near each end, upon which the clothes are to fall as the box revolves, and to sustain them whilst the suds presses upon, and passes through them. A cock is inserted in this box, which the patentee tells us may be opened to admit air from the mouth *to increase the pressure.* How it will effect this, it is beyond our philosophy to tell, as we should apprehend that the condensed air would still press equally on each side of the clothes, and therefore lend no aid in forcing the suds through them. There is no claim.

11. For an improvement in the *Steam Engine*, called THE LUBRICATOR, for applying lubricating substances to the inner surface of the cylinder; Benjamin Reeves, Philadelphia, Pennsylvania, February 6.

The claim of the patentee exhibits pretty fully the general object of the patent; it is in the following words. "What I claim as new, and as my own invention, is a mode, or modes, by which lubricating substances may be applied to the interior surface of cylinders or other vessels in which moving pistons operate, in steam, hydraulic, or other engines, in such manner as to prevent their escape to the cavity of the cylinder, or other vessel, other than by contact with their surfaces."

Several modes, it is said, may be adopted for the purpose indicated, one of which is described in the specification; it consists in leaving a cavity around the piston, in the centre of the packing, which cavity is to receive the lubricating substance. A ring of iron, or other metal, is made of the size of the interior of the cylinder, a groove is formed on the outer edge of this ring, and when the piston is packed the ring is to be inserted in the middle of it. A tube, with a funnel and cock attached to it, passes through the side of the cylinder, and whenever the piston is brought to rest with the cavity opposite to the tube, the lubricating matter may be admitted. There is a second tube and cock on the opposite side of the cylinder to allow of the escape of air, or vapour, which might obstruct the influx of the lubricating fluid. "The lubricator may be supplied when the engine is in operation, by means of cams, or other contrivance."

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12. For an improvement in the *Cutter Plough*, called the "Shovel Cutter;" Samuel Wilson, Darlington Court House, South Carolina, February 6.

The variations in the plough, and in some other machines for which numerous patents are obtained, are frequently so small, as not to appear very distinctly to ourselves, from which cause we are not prepared to exhibit them clearly to others; such is the case in the present instance; the claim is to "the construction of a cutter plough to run on [a] Bull-tongue, or shovel stock, thereby saving two-thirds of the expense of stocking a common cutter plough; and that on the same stock may be run the common Bull-tongue and the Eagle, all of which are much used on our farms." The following is a part of the description. "This plough is made entirely of wrought iron, with wing, bar, and helve, the wing may be any length, width, or thickness. The wing is welded to the Bull-tongue, or helve, and the bar extending to the bottom of both," &c. &c. There is a drawing, but it is *without* "written references," which the law demands.

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13. For an improvement in the *Casting and Setting of Types for Printing;* William R. Collier, Boston, Massachusetts, February 9.

The object proposed is to lessen the labour of setting and distributing type, by casting certain particular combinations of letters in one moveable block, instead of in two or three. "The instances of two or more letters connected, or united, and cast into one moveable block, or type, for which I claim a patent, are the following."

"at, and, as, al, au, ad, ar, ac, am, be, ch, co, ce, do, de, di, es, er, em, en, ed, he, is, il, it, ly, le, li, lo, me, ma, mi, mo, ne, no, ug, ud, ou, or, pe, po, pa, ra, ri, ro, st, sh, so, si, the, ur, ut, us, ul, ve, we, wo."

The patentee states the manner in which he proceeded in making the foregoing selection, as embracing those most frequently required: he also adds a sketch of the arrangement of a case, where these additions to the fount are used; he does not, however, claim this arrangement as included in his patent. He afterwards observes that "the following combinations of letters have been devised by me in addition to those for which I claim a patent in the preceding pages of this document; they are as follows:"

"ab, ap, ag, by, bl, ba, bi, be, ct, ci, ca, cu, da, du, ea, ev, ei, ec, et, el, eb, en, ef, ec, ha, had, hi, ho, fo, fe, fa, fu, ga, gi, ge, go, gh, gy, im, if, iv, ke, la, lu, my, nt, ne, na, ni, ny, us, ob, oc, ol, oy, om, os, ot, od, op, oro, pr, pu, pi, ry, rd, ro, ru, su, sa, sl, tr, to, ty, ta, ti, tu, um, ud, va, vi, vo, wa, wi, yo, bo."

"The above combinations are of the same nature, and were invented in the same manner and at the same time with those for which I claim a patent, but as they are not so useful, I do not *at present* intend to ask a patent for them. They are inserted, however, as a proof of the priority of my invention."

If the patentee intends at some future day to ask a patent for the foregoing combinations, we apprehend that his insertion of them in a public document will not operate as a caveat, and protect his right for a given time. Patents can be sustained only for what is new, a quality not communicated or increased by time. When our discoveries have been ushered into the world, they, like ourselves, are daily waxing old.

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14. For *Carding and Dressing Cloth* by machinery, called the "Fuller's Nap and Card Machine;" Joseph Groff, Rappo Township, Lancaster county, Pennsylvania, February 10.

The cloth is made to pass successively over a press roller, a card roller, and a dress card, on a flat board. The arrangement made, the patentee says, "has been found to answer the purpose intended of giving cloth a more regular and better dress than by hand." It would appear from the foregoing, that he entertains the opinion that cloth has never before been dressed by machinery. There is no claim made, either to the general arrangement, or to any particular part.

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15. For an improvement in Edmund Warren's *Thrashing*

Machine; Daniel Mayer, Kingstown, Berks county, Pennsylvania, February 10.

We shall not refer to Edmund Warren's machine, as the one at present under consideration differs so little from many others, that we do not think much information would be obtained by the reference.

A cylinder with beaters, and the usual appendages, form this machine. The hollow segment in which the cylinder, with beaters, runs, is formed, like many others, of fluted rollers; a part of these are to be borne up by weighted levers. The grain after passing with the feeding cloth, is received between two feeding rollers which conduct it to the segment. These appear to be the *novelties*, as they are the points claimed. "What I claim as my invention is the construction of the above described machine, with the levers placed under the curved bed, with the weights attached to the ends of the same, formed of wrought or cast iron, and the stationary metallic grooves for the gudgeons of the rollers to work in, and the double rollers above mentioned."

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16. For a machine for *Dressing Hemp and Flax after it is Broken;* William K. Scott, Sandy Hill, Washington county, New York, February 11.

We cannot, within the space to which we must confine ourselves in our monthly list and analysis of patents, give a clear idea of the above machine, which, both from the description and from credible information, we believe to be one of great value, as it certainly is one of much ingenuity.

It is probable that we may hereafter publish the description, with a plate; at all events, we will again take it up, and endeavour to give a clear abstract of the specification, which is of considerable length.

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17. For an improvement in the *Power Loom*, called "The Improved Vibrating Cam Loom;" William K. Howard, Worcester, Worcester county, Massachusetts, February 12.

The patentee first describes the general construction of the power looms now in use, in order the more fully to illustrate his improvements. In doing this he refers to the drawings, without which it would be in vain to attempt a description. A vague idea of the nature of his improvements may, perhaps, be afforded by what he claims; he says, "I claim the particular method of applying the vibrating cams more directly, simply, and effectually, than ever before done; and also that of the cross girth. In pointing out my improvements, reference is to be had to the drawings deposited in the patent office."

"My improvement consists, 1st, in making the circular mortises (called 'vibrating cams,' as above) in the lathe standards, instead of having a separate piece for that purpose alone."

"2nd. That of applying the cross girth so as to admit of the cams

straddling said cross girth; and that part called the sway staff being hung on a pivot on the cross girth."

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18. For a mode of *Unfurling the Condensed Woollen Roping in the Process of Spinning on the Common Jenny;* Cyrus Greenwood, Winchester, Cheshire county, New Hampshire, February 13.

To afford any adequate idea of the operation of this machine would require a drawing. There is a particular combination of wheels, a rack, and their appendages, for the purpose of communicating the propelling power to the drum shaft, by which the roping is unfurled; which combination constitutes the subject of the patent.

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19. For an improvement in the *Percussion Lock for Fire Arms;* Samuel Forker, Meadville, Crawford county, Pennsylvania, February 13.

(See specification.)

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20. For a machine called the "*Animal Rapid Rail-road Carriage;*" James Stimpson, Baltimore, Maryland, Feb. 16.

We know not the number of true and original inventors or discoverers of that kind of rail-way carriage in which the horse is to ride, walking upon a moveable endless floor running upon rollers, which are so geared to the wheels as to cause the carriage to travel at a rate many times exceeding that of the motion of the horse upon the floor. We have before alluded to it, as it has been previously patented, and has also been displayed in various newspapers, by means of a large wood cut. In all its essential features the carriage now patented resembles those to which we allude. It is proposed to make a very liberal use of friction wheels to support the gudgeons of all the revolving parts; there are also some other minor arrangements made which may be new, but it is not for these merely that the patent is taken, as will be seen by the claim.

"What I claim in the before mentioned carriage as my invention or improvement, is its application to horse or other animal power, whereby he or they can travel in and upon said carriage either upon roads or rail-ways, and by so doing impart a power to move said carriage with accelerated or diminished speed, compared with that of the actual travel of said animals."

"I also claim the application of the invention of friction wheels to sustain the weight of said animals, and the weight of the pulleys under the flexible floor; and the double rows of pulleys, or drums, under each band."

"Also the application of friction wheels to support the weight of the frame, animals, apparatus, and load, connected with and about said frame; said carriage itself being a new and useful improvement as a locomotive carriage, before unknown or used."

"I also claim the application of the gear principle, whereby a va-

riation of the speed of the carriage, more or less, is effected without varying that of the animals as hereinbefore described."

The gear principle alluded to in the last claim, is the placing upon the carriage wheel to which the driving power is applied a number of toothed wheels, concentric with the axis, so that by shifting the driving wheel from one to the other the alteration required will be effected.

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21. For a composition called *Leather Paper;* Ephraim F. and Thomas Blank, New York, February 16.

(See specification.)

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22. For a machine for *Cutting Plasterer's Laths* for the ceiling of houses, &c.; John N. Lynch, Dillsburg, York county, Pennsylvania, February 16.

This machine consists of a long plank, which operates as a plane stock; this plank is made to slide upon its edge, between upright standards upon a firm platform; a wide iron, like a plane iron, is fixed so as to cut on one face of this plank, much in the manner of the cutters of some shingle machines; the throat of the plane, if we may so call it, has other cutters standing at right angles with the first cutter, and at such distances apart as to reduce the laths to a proper width. The cutter plank is made to traverse by means of a pitman at one end, operated upon by any suitable power.

"What I claim as new, and of my original invention, is the entire machine as applied to the operation of cutting or dividing plasterer's laths, for ceiling houses, &c., and more particularly the dividing knives situated between the bearers for cutting laths to the proper breadth after they have been cut from the bolt by the main cutter."

The bearers above spoken of, are plates of iron which form a part of the face and throat, to prevent the wood from wearing.

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23. For an improved *Truss for Ruptures,* called the "Spiral Spring Truss;" John J. Heintzelman, Philadelphia, Pennsylvania, February 16.

The specification sets forth that the trusses heretofore made have been very carelessly finished, so as to be but little calculated to answer the intended purpose. The improvements proposed are intended to obviate the defects arising from this cause, and to furnish an instrument more perfect in its operation. The circular spring, which is enclosed within the leather covering, is to be of well tempered steel, instead of hammered iron. The pad is to have two plates, forced apart by spiral steel springs. The circular spring is to be attached to the back plate of the pad by means of screws working in a slot, so that it may be lengthened or shortened as may be found necessary. There is a buckle to the strap in lieu of the ordinary holes and buttons. The claims are as follow.

"I claim every mode of junction of the truss formed on any union of the spiral, or other spring possessing elasticity, or rotary motion; with a slide in the circular spring, for lengthening or shortening the same; together with a buckle and strap for fastening the same around the body, which I find to answer perfectly well."

We believe that the lengthening and shortening of the truss by the slot, and tightening screws, is new; but the claim to "the spiral, *or other* spring, touches ground which has been pre-occupied, and that by more than one incumbent; the securing by a buckle, has been used; the studs and holes were adopted, probably, for the sake of economy, but the buckle has been frequently resorted to since, and certainly has been found "to answer perfectly well."

A good drawing accompanies the specification, but it is *without* written references, and therefore does not fulfil the demands of the law.

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24. For an improvement in the *Machine for Stuffing Sausage Meat;* Samuel Fahrney, Washington county, Maryland, February 16.

Mr. Fahrney obtained patents for two machines, one for cutting, and another for stuffing sausage meat, dated December 9th, 1828.

The present stuffing machine differs considerably in its construction from the former; it is more simple, and, we doubt not, is a better instrument. A cylinder, with four wings, or leaves, is made to turn in a trough; these wings slide through the body of the cylinder, in the manner of the valves of Bramah's, Cooper's, and some other rotary pumps; a circular excavation in the trough, eccentric with the cylinder, serves to guide them in and out. A hopper is placed above the trough and cylinder, into which the cut sausage meat is to be put, which, on turning the cylinder, is carried down into the trough, by the extended wings or leaves, and round to the opposite side where there is an opening through which it is to be forced, the form of the excavation in the trough causing the valves to recede, and preventing the carrying of the meat out again. To the opening a tin tube is attached, which extends several inches in length out of the trough, and upon this the gut to receive the meat is to be drawn. When the crank is turned the meat is forced out in a continued column. The claim is to the general construction of the machine.

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25. For a diving apparatus called the "*Submarine Explorer;*" Sewall Short and Noah Bradford, Barnstable, Barnstable county, Massachusetts, February 18.

This diving apparatus consists of a hollow buoy which floats in the water, and is in form like an inverted bell. Both ends of this buoy, or bell, are open. It must be made of light materials, and covered with leather, or other substance, so as to render it impervious to water. There is a platform, or seat, around it on the inside, to accommodate the assistants. To the lower end of the buoy is attached

a flexible water tight tube, which may be two feet in diameter, and must extend down nearly to the bottom of the water. The tube is distended by strong iron rings, and sunk by means of weights; its lower part terminates in a water tight dress, fitting the legs and arms, and kept distended, like the main tube, by suitable rings; light is admitted through openings occupied by strong panes of glass. The whole apparatus thus forms a bag open at top, but closed below. It is to be moored in a secure way, and to be of sufficient length to allow it to rise and fall with the motion of the water, without disturbing the operator.

A windlass is provided, which crosses the floating buoy, and is intended to draw the diver up when necessary, an air tube to force air down, and an hydraulic tube to pump any water up which may accidentally enter, are also appended.

The claim is to the general arrangement and construction of the apparatus as above described.

We have omitted the description of some of the auxiliary apparatus, as unnecessary to our purpose. An instrument of the kind described would probably answer well in places where the water was not very deep; at great depths, the operator would find it extremely difficult to move about, as the large leather tube, must, to a certain extent, move with him; the pressure of a current, running with moderate force only, would be immense upon a tube of the requisite diameter, when extended to a great length.

The dress intended to fit the arms, and the lower parts of the body, is very similar to what has been already introduced, and used with some success.

Any flexibility in the main tube, to allow it to rise and fall with the motion of the water, must exist at the upper part only, as the pressure at considerable depths would be such as to prevent any such motion; the tube must there be so kept out as to be incapable of being shortened by the folding in of the leather, or otherwise the buoy, or flat, would be drawn under water.

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26. For the manufacture of *Paper from Straw, Hay, or other Vegetable Substance;* William Magaw, Meadville, Crawford county, Pennsylvania, February 19.

(See specification and remarks.)

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27. For an improvement in the mode of *Cramping or Forming Boot Fronts;* Amasa Dunbar, Sharon, Norfolk county, Massachusetts, February 19.

A boot former of the ordinary shape is prepared, and is to be affixed by its back edge upon the lower side of a strong iron lever. Below the former a pair of cast iron jaws stand upon a firm bench: these jaws are so shaped as to receive the former when it is pressed down by the lever, and serve to press the leather so as to give it the intended set.

When the leather is placed upon the former, preparatory to its being forced between the jaws, it is clasped at its edges by pincers constructed for that purpose. These pincers are placed so as to straddle the upper edge of the lever, and are made to hold the leather on each side; the pincers are worked by a screw and crank, which draws the leather close to the former. The patentee considers the construction of these pincers "to be an entirely original invention, and a very important discovery in rendering the machine perfect in its application. It is designed to seize the leather as soon as it is presented on the form, and as the form is pressed into the jaws, the pincers, or elevator, being worked by the screw and crank, closes on the leather, and clasps and draws the corners into shape, which is the most essential part in forming the leather, and the most difficult to accomplish." There is no claim; the whole arrangement, of course, is considered by the patentee as new.

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28. For an improvement in the *Drapery and Ornaments for Window and Bed Curtains;* William F. Phyfe, New York, February 19.

As the specification is a brief one, we give it entire.

"The improvement herein claimed consists of the mode of attaching the drapery. The drapery, which may consist of any suitable material, is first laid in pleats and sewed flat. At their heads the pleats are scolloped, forming points at each side, or double edge, to which the rings are secured. The rings pass through and turn in the bars, or other ornaments which are secured over the window in the ordinary manner. The subscriber claims the sole privilege of attaching his new style of drapery to the rings as above specified. He also claims the privilege of using drapery of any pattern as heretofore used." "WILLIAM F. PHYFE."

Although patents of the foregoing class are of but little importance in a national point of view, and give nothing to the public in return for the exclusive right conferred, they are yet frequently valuable to the patentee. A contrivance, or device, which is the mere creation of fancy, and whose existence must be as ephemeral as that of fashion herself, must keep its reckoning by months, and not by years; still it is due to the individual who has made any device which will catch the public for a time, that those in the same business with him should not deprive him at once of all the benefit which he ought to derive from his ingenuity or taste. Were it possible to prevent the obtaining of patents for what is of no use to any one, much good would be thereby effected, but where an individual may be benefitted, and the public not injured, we would not proscribe them, although in a general point of view, they may be for objects which are absolutely trifling.

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29. For an improvement in *Iron Dogs for Saw Mills;* Martin Rich, Candor, Tioga county, New York, February 19.

The dogs proposed to be used are similar in form to those generally employed, being that of a quadrant, or half bail, one on each side of the kerf in the head block; the following is the principal difference as stated by the patentee. "One of the half bails has three teeth, two of them on the upright part of the dog, one at the top and the other about the centre; these teeth must be of sufficient length and width for a screw to pass through each. Two screws are made of iron, about three-fourths of an inch in diameter, and about four inches long; these screws are for a set, or gauge, for the sawed side of the log to bear against. A nut about two inches square is put on the end of each screw, next to the log, also a nut on each screw on the other side of the tooth, for the purpose of binding the screw if it should ever wear loose." The teeth on the other dog are without screws, and are placed a little differently from the former.

"The advantage in the above described dogs over any other now in use, is, that the boards will all be of an equal thickness: that the saw will run entirely through the log; that it is more convenient to set in the night than any other."

"What I claim as my improvement, is the particular situation and construction of the teeth, and the screws to set the log."

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30. For a mode of *Tightening Leaky Dams*, and so constructing new dams as to secure them from leaking; John M. Syme, Richmond, Virginia, February 22.

(See specification.)

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31. For a *Pendulous Rail-road Car;* Samuel T. Jones, Philadelphia, February 22.

(See specification, page 149.)

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32. For *Adapting Rail-way Carriages to run upon Ordinary Roads, &c.;* Samuel T. Jones, Philadelphia, February 22.

(See specification, page 151.)

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33. For a method of *Raising Canal Boats, or Ships, Houses, &c.;* William W. Smith, Rochester, Monroe county, New York, February 23.

Nothing can well be more *simple* than the apparatus described in the specification, for raising boats, SHIPS, &c. "Four or more levers acting on a fulcrum, one end of said levers pass under the bottom of the boat or object proposed to be raised; the other end of each lever is pierced by a screw of wood or iron, which enters the bed timber below, and passes into a wooden box sunk and secured under the surface of the earth."

"On the surface of each lever, and just below the head of the screw, is a platform of boards, or plank, which, of course, rise or fall with the end of the levers when the screws are put into opera-

tion, and are intended for the men to stand upon when turning the screws. The heads of the screws are pierced by hand levers, by which they are turned by the men standing upon the platform."

"In some circumstances, as in the raising of old boats, it may be necessary to have the two centre levers about five feet longer than the two outside ones; the usual length of the main levers is forty feet, and eighteen by twenty-four inches square in the centre, and the fulcrum is placed at, or near the centre. But I do not confine myself to these dimensions, as the length, size, and strength of the levers must be adapted to the nature and quantity of matter they may be required to raise."

"When a boat, or vessel, is raised sufficiently high from the water, a floating platform may be passed under the bottom for the workman to stand upon while repairing the boat."

We have thought it best to give the whole specification, that the merit of the invention might be completely before the reader. The whole is viewed by the patentee as new, as he has not claimed any particular part, and, as applied to the raising of *ships*, &c. out of the water, we apprehend that such a thing has never yet been attempted in this way.

A drawing accompanies the specification, in which a canal boat is represented as snugly stationed upon the ends of four levers, by which it has been raised to the horizontal position. The levers must have been at first very obliquely placed, when passed under the bottom of the boat, but it appears, notwithstanding, to have kept its place, without having been in the slightest degree abridged of its liberty by bolts, bars, ropes, or chains. A ship, probably, would have been much less tractable.

The modern contrivances for raising vessels from the water have become very numerous, but they are all unlike that of the present patentee, and we doubt very much whether the celebrated machines used by Archimedes, to the great annoyance of the Romans and their ships, bore any resemblance to it.

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34. For an improved *Mill for Grinding Corn* and other substances; Increase Wilson, New London, Connecticut, Feb. 23.

"The improvement consists in the connecting two or more cast iron mills (or the grinding parts thereof) together, by means of several iron spur or bevil wheels, with iron shafts and coupling boxes, or clutches, so that by turning one shaft, one or more of said mills are put in operation."

"There is an advantage in having two or more small mills instead of one large mill to grind equally fast; *true*, small castings may be easily obtained, while those of a large size are apt to warp or spring in casting, and small castings are usually harder than large ones."

In the drawings, the mills represented are in the form of the ordinary patent cast iron coffee mill, with their hoppers. A second large hopper is to be made to surmount and to supply these with the grain to be ground.

35. For an improvement in the *Process of Finishing Woollen Cloths;* Zachariah Allen, Providence, Rhode Island, Feb. 23. (See specification.)

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36. For an improved mode of *Making or Manufacturing Spools or Bobbins* with collar barrels and boxed heads; William Clegg, Norwich, New London county, Connecticut, Feb. 24.

"The heads are made of two pieces of wood glued together with a round hole through them, and boxed partly through to receive the collar on the barrels; the barrels, and collars on their ends, are all of the same piece of wood, the collar entering the head, and the small part of the barrel passing through the head, and secured by glue, wood and iron, or either of them."

It is said that the spools made in the manner adopted by the patentee, are not liable, like those formerly used, to have the heads separated from the barrels, broken, and otherwise deranged.

The description as given by the patentee, appears to us to be extremely obscure, and the drawing furnished is without written references; we collect, however, from the whole, that his spools, or bobbins, are turned with small heads, in one piece with the barrel, and that these small heads are let into others of the usual size, to which they are fastened by glue, or otherwise.

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37. For a *Door Spring;* Isaiah Eaton, Boston, Massachusetts, February 24.

This appears to us to be a simple and neat application of a spring for closing doors. A barrel like that of a spring clock, encloses a spiral steel spring, which may be half an inch wide, and six or seven feet in length when unwound. One head of the barrel has a firm arbor, to which the inner end of the spring is fixed; this head is screwed on the under side of the upper part of the door frame. A cat gut, or other cord, winds around the periphery of the barrel, the other being fastened to a staple near the top of the door. The action will be at once perceived by every one acquainted with the operation of the main spring of a watch or clock. The barrel may be a neat brass box, and occupy but little room. When used for an outer door, the barrel must be fixed upon the door, and the staple on the door frame.

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38. For an improvement in Hascalls's improved *Grist Mill;* William Coleman, Euclid, Cayahoga county, Ohio, February 25.

This is another addition to the list of portable grist mills, which have become so numerous as to leave but little chance of any essential variation in their construction, and, consequently, to render it difficult for the patentee to tell in what the novelty of his invention consists; all the account we shall pretend to give of the present invention, is contained in the claim set up.

"What I claim, is, the reducing the face of the running stone to

a plain surface; (whereas Hascall's is cone shaped,) and the making nearly a plain surface to the bed, or standing stone; (whereas Hascall's is deeply concave) and for resting the running stone upon the top of a convex spindle in a tapering mortise, by which the stone gains an undulatory motion, (whereas Hascall's is fixed firmly to the spindle, and has no other than a horizontal motion.) The stone may be hung upon a bail in the ordinary manner of hanging mill stones. I also claim the invention of a portable frame, by which the whole mill becomes portable, (whereas Hascall's is fixed to a certain spot.) And I also claim the right of applying 'Coleman's portable' mill to all the uses above mentioned."

Mr. Coleman seems to think that every variation from Hascall's mill must be a novelty, and will, therefore, entitle him to the claim of an invention. Mr. Hascall made one stone conical, and adapted the other to it. Mr. Coleman brings them both back again to the ordinary form of the face of mill stones, and makes a claim. Mr. Hascall fixes his mill to the floor, or to the building, and Mr. Coleman differs from him, as many others have done, by allowing the frame work to be moveable, and claims to be an inventor. We think that an examination of the patent office, and of other sources of information upon such subjects, would have eventuated in convincing the patentee that portable grist mills, flat stones, and runners with an undulatory motion, were every day contrivances.

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39. For an improved *Press for Pressing Cheese;* Reynold Webb and Jonathan Coe, Madison, New Haven county, Connecticut, February 27.

The follower of this press is acted upon by eccentrics placed at each end of a shaft, or windlass; the cheeks of the press rise in the ordinary manner, with a bed piece upon which to place the cheese, or other article to be pressed; the follower is notched to fit, and slide within the cheeks, as usual. An iron, or other friction roller, is placed on the upper side of the follower at each end. Above these a shaft, or windlass, is fixed, the gudgeons of which turn in the cheeks. Cast iron eccentrics, or curved pieces, which operate as progressive levers, are fixed upon the windlass, and act upon the friction rollers on the follower, the windlass being turned by a lever. Such a curvature may be given to these pieces as may best suit the purpose for which the press is to be used.

The claim is to "the combination of the powers of the lever and wedge, or inclined plane, by means of the circular cross piece, [windlass] and the curved, spiral, or scroll pieces attached to the ends thereof, and operating on the small wheels, as described."

"The patentees state that "this process is simple in its construction, easily managed, and kept in order, portable, and possesses great power, which is easily brought into operation, and very little retarded or diminished by friction."

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40. For a *Machine for Washing Clothes;* Charles L. Clowes, Union, Loudon county, Virginia, February 27.

On recurring to No. 10, p. 292, the description of a washing machine by Messrs. Barney and Beach will be found, and will answer perfectly well for the above; there, however, is an addition to the present machine, which consists of "a hollow cylinder, having pins, or projections, on every part for laying hold of the clothes within the revolving box." The revolving cylinder is placed loosely with the soap suds and clothes, within the revolving rectangular box. The claim is to "the *peculiar construction* of the above described machine, with the revolving rectangular box, and hollow cylinder within it."

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41. For a *Machine for Cutting Sausage, or Minced Meat;* Jacob Robinson, Lancaster county, Pennsylvania, February 27.

A wooden cylinder is made to revolve within a box; this cylinder is surrounded by knives which pass between other knives fixed upon the sides of the box, the upper part of the box serves as a hopper, within which the meat to be cut is placed. The meat is to be repeatedly passed through these cutters, and thus reduced to a proper fineness.

There is no claim.

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42. For an improvement in *Cradles or Cribs;* John M. Read, City of New York, February 27.

In this cradle the child is not to be rocked from side to side in the usual way, but is to receive a vibrating motion longitudinally. There is to be a frame made with four legs, in form something like a child's crib, within which the cradle is to be suspended; the suspension is effected by allowing four strips to hang from rails on each side of the frame, one near each corner; these strips work on pins passing through their upper ends, admitting them to have a pendulating motion; the lower ends of the strips are attached to the bottom of the cradle by pins, or joints, similar to those at top. To a lower rail of the frame a treadle is fixed, for the purpose of rocking the cradle with the foot; a string is also attached to the cradle by which it may be moved by a person in bed; or the string may be passed round a pulley, to enable the child to rock itself.

There is not any thing particularized as claimed, and we are, therefore, left to the conclusion that the whole is new; the kind of sifting motion given to the cradle we believe to be absolutely so; its utility we are unable to discover.

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43. For an improvement in the mode of *Stamping Letters for Post Offices*, called the "Post Master's Stamp;" Asa White, Type Founder, Templeton, Worcester county, Massachusetts, February 27.

The improvement consists in making the types which express the name of the post office, wedge formed, so that they may be the better set in a circle like the stones of an arch. A metal block is pre-

pared, around which they are to be placed, and secured thereon by a brass ferule and a screw ring. The month and day are to be set in a mortise in the middle in the usual way. The block is to be attached to the end of a lever, having along side of it a stereotyped wheel, with the different rates of postage, and the words "free," and "paid," cut upon the face of it; this wheel can be turned round so that any rate of postage, or word upon its face, may be made to coincide with the face of the main stamp. A cup of printer's ink and a small inking ball, form a part of the apparatus; when the type is inked, the letter is placed upon a block, or cushion, and the stamp forced against it by the lever.

"What I claim as my own improvement, is, the stereotyped wheel; the manner of binding the types in the stamps; the shape of the body of the types, and the application of the lever, as described."

The post office stamps are now frequently made of cast steel, with the name of the office cut out of the solid, and a mortise formed for the date. Many have also been made of brass, but from the rough usage they often receive at the post offices, they are frequently defaced; steel, therefore, has been substituted. The objection to types is their brittleness, and the consequent facility with which they are destroyed by the careless hands in which they are placed; they certainly have the merit of superior neatness, but we think the durability of the steel stamps will secure to them a preference over all others, and that time will prove them to be the cheapest.

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44. For making *Blind Fasteners*, called the "Gravitating Blind Fastener;" James A. Carver, Taunton, Bristol county, Massachusetts, February 27.

A few years ago blind and shutter fasteners were patented almost as frequently as churns, washing, and thrashing machines now are, but, for a while, they seemed to have run out, the varieties having apparently become exhausted. To us the present fastening bears the aspect of a resurrection more than that of a new creation; a bolt is to slide in a socket, so that it will fall down freely, like many other bolts, by its own gravity; this is to be fastened upon the lower rail of the blind; a catch in the form of those made for latches, is to be driven into the wall, to hold the blind back, and a similar catch driven into the window sill, to retain it when closed. The great difference between this and the kind now most commonly used, is that it is without a spring, falling into its place by the newly discovered principle, gravity. There is no claim whatever; a prudent precaution on the part of many patentees, and one, the frequency of which, in the present day, our readers must have noticed.

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45. For an improved *Stove to be Heated by Stone Coal;* Philip Benedict, Lancaster, Lancaster county, Pennsylvania, February 27.

This stove is very much like the common ten plate stove, but, as

it is for coal, it is of course provided with a grate in the fire-place; "one other plate is set in the centre of the stove, crossways, the edge resting on the bottom plate, and fitting to the sides, and extending up within three inches of the bottom plate of the oven." This plate is the only point in which this stove appears to differ from the common stove; the use of it we are not told, but suppose it is intended to lessen the fire-place, and perhaps to force the heated air up against the lower plate of the oven; this manner of fixing the plate would leave a large hollow space behind the fire, respecting which we find no provision.

The claims are "the height from the bottom to the oven; the manner of dividing that part by a plate, the manner of placing the grate and lining, and the necessary doors, and applying it to the use of stone coal."

The particular dimensions of the different parts are mentioned, and of these "the height from the bottom to the oven" *forms one of the claims.* It is proposed to line the fire-place with plates of cast-iron, to keep the fire from acting directly upon the external plates; we are told, however, that instead of these plates, fire brick may be used; after this, the lining is claimed, then the necessary doors, and then the using the stove for stone coal, which completes the list of discoveries, or improvements.

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a patent for an improvement in the Percussion Gun Lock, for Fire Arms. Granted to SAMUEL FORKER, *Meadville, Crawford County, Pennsylvania, February 13th,* 1830.

THIS improvement consists in the simplification of the percusslon lock in the new formation and arrangement of the parts; dispensing with all superfluous fixtures, and reducing the number to six, viz.—the main spring, lever or cock, pivot, dog, tumbler pin, which also serves for trigger, and feather spring.

The main spring is affixed to the side of the barrel, and presses upwards against the lever (which is placed horizontally on the top of the barrel,) close behind the pivot. The lever is about two inches in length, with a concave hammer or a point, according as it is wanted for the percussion cap, or the grained percussion powder. It is let down into the pivot post, which stands perpendicularly on the side of the barrel, and is confined to its place, by a pin passing through it, about three fourths of an inch from the hammer. To the hinder extremity is fastened the tumbler pin, passing perpendicularly through the stock behind the breech, and which is provided with notches, which when the end of the lever is pressed down, take hold on a dog affixed to the end of the breech. When cocked, the lower end of the tumbler protrudes through the stock, and serves for a trigger. The feather spring is a thin piece of steel pinned to the back of the tumbler pin, or trigger; the upper end of which, pressing against the

hinder end of the lever, causes the notches of the tumbler to fall into a corresponding notch of the dog.

The inventor claims, as his exclusive improvement, the form and arrangement of the parts of the lock, so as to render it more simple, safe, certain and effective.

Samuel Forker.

Specification of a patent for a machine for Grinding Flax Seed, and other kinds of grain, paints, medicines, and other substances. Granted to Asahel Cross, *and* Ezra Brown, *Cazenovia, Madison County, New York, February 4th,* 1830.

On a horizontal shaft two feet six inches, or three feet in length and ten inches from one end of the same, is placed a cast iron wheel, eighteen inches in diameter, and one inch, or more, in thickness; the flat sides of which are turned straight and smooth. Two cast iron wheels, or cylinders, nine inches in diameter and four inches in thickness, the circular surfaces of which are turned straight and smooth, are placed on two shafts, two feet in length and near one end of the same. These shafts are placed in a horizontal position across, and at right angles with, the first mentioned shaft, and from three to four inches below the same (measuring from centre to centre) one on each side of the flat wheel, and in such a manner as to bring the smooth surfaces of the cylinders in contact with the smooth sides of the flat wheel; the outer ends of the cylinders extending as far as the outer extremity of the flat wheel at the point where they come in contact. The pivots on the ends of all the shafts run in boxes of metal, or other substance, attached to a frame prepared for the purpose.

The perpendicular flat wheel constitutes the principle of the improvement in the above machine, by operating between two cylinders, or rollers, similar to those heretofore in use.

Operation.

This machine is propelled by water, hand, or other power, by attaching a pulley and strap, or other gear, to each shaft. The seed &c. is fed from above into the machine, on each side of the flat wheel, between that and the cylinders. The flat wheel and cylinders are put in motion in a direction calculated to draw the feed between them; the flat wheel and cylinders making an equal number of revolutions in the same time. For some uses, this machine may be made much smaller than above described; but the flat wheel and cylinders should be nearly in the same proportion to each other.

The principle of this machine in its operation, in its improved form, is, it breaks the seed or substance, and at the same time, by the raking motion of the flat wheel against the cylinders, in consequence of their being placed below its centre, it effectually grinds or pulverizes it.

Asahel Cross,
Ezra Brown.

Specification of a patent for an improvement on Mordan's ever-pointed Pencil Case. Granted to JOSEPH SAXTON, *Philadelphia, Pennsylvania, April 11th,* 1829.

THE old construction of the ever pointed pencil case, on which said improvement is made, consists of a cylinder that slides inside of a case similar to those used for the ordinary cedar pencils, and may be slid in or out in the same way, being connected with the outer slide of the case by means of small pins or screws. Through the cylinder is cut a left handed female screw, in which acts a male screw, to which is joined the small wire that propels the lead. Part of this screw is filed away, so as to form two flat surfaces in order to slide in a slit cut in a second cylinder, fitted exactly into the first, and made to extend a short distance above it. To the upper end of this small cylinder is fastened a collet, which projects over the end of the larger one; and while it permits this larger cylinder to revolve freely on the smaller, prevents the latter from drawing out. The lower end of this smaller cylinder projects a sufficient distance below the other, to be held between the fore finger and thumb of the left hand, and inasmuch as the small screw passes through the slit in this cylinder, it cannot turn but as it acts in the thread of the outer cylinder which revolves by turning the case, this screw, to which the propeller is attached, must move either up or down, according to the way in which the case is turned.

The improvement on the above described pencil case for which alone a patent is claimed, consists, first in screwing the point through which the lead is propelled into the first described or outer cylinder within the case, to which the external slide is attached, instead of the inner or second above described cylinder, thereby making but one sliding joint between the point and outer tube or case. Secondly, in simplifying it by continuing the female screw in said cylinder its full length; so that the male screw of the propeller may act in the same thread into which the point screws. Thirdly, in causing the propeller to move by means of a piece of square wire attached to the upper part of the screw, whereby said screw is left whole, and the thread continued all round; whereas in the other more than one half of the screw is destroyed by flattening the sides, leaving but a small proportion of the thread to project out of the slit in the second described cylinder. By this new arrangement of the parts but one cylinder is required, which must be made of a size that will slide accurately in the outer tube or case. In this cylinder the propeller works by its screw made to fit in that of the cylinder. The upper or square end of this propeller must be rather more than double the length of the point through which the lead passes, so that it may always be within the square hole in the lower end of a tube above it, and within the outer tube or case. In the upper end of this tube is fitted a plug, having one end fastened to it, and after fitting a collet or band that shall revolve on this plug, the other end is to be fastened permanently to the first or upper section of the outer tube or case; and this

collet is then to be secured either by screw or otherwise to the inside of the upper end of the second section of the outer tube or case, which will prevent the inner tube or key that turns the propeller, from having any lateral motion; but will permit it to revolve with the upper part of the case to which it is connected; and by turning which (the lower section being held firm,) the propeller will move either up or down. It is for the above new arrangement and simplification of the parts, by which a cheaper, more convenient and durable instrument may be formed, that I claim a patent for a new and useful improvement on Mordan's patent ever pointed pencil case.

JOSEPH SAXTON.

Fig. 1.

Fig. 2.

Description of the Drawing.—Fig. 1. A longitudinal section of the case.

Fig. 2. The propeller, with its screw; the upper part of the propeller being formed of square wire.

A. Cap which screws on and closes the chamber for the spare pencils, and retains B in its place.

B. The part which is to be turned round to advance the pencil.

C. Collet which is soft soldered to the outer tube, but allows the inner tube or plug, to revolve when the part B is turned.

D. The lower end of the brass tube or plug, with a square hole in a piece which closes its end, through which the propeller slides.

E. The slide which retracts the point F, which point is screwed into the sliding tube; within this the female screw is shown, and the male screw of the propeller.

Mr. Philip Garret, watch maker of Market street, Philadelphia, is the proprietor of the above patent, and manufactures the cases.

Specification of a patent for an improvement in forming the Nap upon Woollen Cloths. Granted to ZACHARIAH ALLEN, *Providence, Rhode Island, February 2nd,* 1830.

THIS improvement consists in extending the cloth, upon which it may be required to raise a nap, very smoothly and firmly over a solid arbor, or edge, and in causing the wires, or cards, set in a cylinder, to act only upon that portion of the cloth which is passing in actual contact around, or over, the solid arbor or edge; thus bringing the wires to act by a gauge or screw with accuracy and certainty

upon all parts of the face of the cloth, and at the same time to penetrate no farther or deeper into the texture of the fabric, than may be found proper to raise a nap without injuring the texture of the cloth.

The improvement herein claimed consists in causing the wires to act upon a portion of the surface of the cloth extended smoothly over a solid body, so that every part of the cloth, thus extended on a hard surface or solid body, may be brought under the action of the wires without a possibility of retracting therefrom, or bagging in the looser parts, and without having some portions of it more intensely acted upon than others, whereby the nap is not only unequally raised, but the cloth itself is subject to be chafed through and damaged, as is the case when it is attempted to raise a nap otherwise than when extended upon a hard, smooth surface or cushion.

ZACHARIAH ALLEN.

Specification of a patent for Tightening Leaky Dams, and so constructing new dams as to secure them from leaking. Granted to JOHN M. SYME, *Richmond, Henrico County, Virginia, February 22nd,* 1830.

IN tightening a dam already built, an encasement, or work of plank and posts, is to be constructed the whole length thereof, reaching from the bottom of the stream to the top of the dam. The posts which secure this encasement are bolted to the works in the bottom of the stream, or otherwise effectually secured, and connected with the dam by strong ties. The space between the planking and the dam may be one foot, or more, according to circumstances, and is to be filled into the top with clay, or other proper materials, which must be well puddled and secured throughout; it is then to be closely sheeted over so that the puddling cannot be washed out or disturbed by the current passing over the dam.

In constructing a new dam, (in which case the expense will be considerably lessened,) the same plan is to be pursued. The puddling completely and effectually prevents the escape of water through the dam, and thus all the small particles which are usually carried through the interstices or crevices in the dam, with the small, but powerful currents of water passing through them, are lodged on its upper side, or face, and forced into these interstices by the great pressure of the water, and in a short time render the dam so compact, solid, and impermeable, as, after a time, perfectly to secure it, in all probability, from leakage, as long as the materials of the dam last, even if the encasement should be injured or destroyed. I claim as new and original the whole of the above described mode of tightening leaky dams, and so constructing new dams as to secure them from leaking.

JOHN M. SYME.

Remarks by the Editor.—Neither the principle or the practice pointed out in the foregoing description appears to us to possess any claim to novelty. The imperviousness of clay to water, has caused it to be frequently used in dams and embankments, to prevent leakage. Coffer dams are filled with it whenever it can be readily procured, and for the purposes of puddling it is frequently transported to great distances. We scarcely know of an idea more familiar to us than that of employing clay for the purpose, and in the manner above pointed out; we should have resorted to it in erecting a structure of the kind, without the most remote suspicion that we had been performing an operation possessing any of the attributes of a new invention or discovery, and had any one made the enquiry of us how a dam might be prevented from leaking, we believe that the first suggestion would have been the mode claimed in the foregoing patent.

Specification of a patent for certain improvements in the process of Finishing Woollen Cloths. Granted to ZACHARIAH ALLEN, *Providence, Rhode Island, February 23d,* 1830.

THIS improvement consists in laying the folds of woollen cloths smoothly between metallic plates, and in this state immersing the cloth in steam or heated water, and in subjecting the cloth, whilst thus immersed, in steam or hot water, to a heavy pressure, by means of a screw or otherwise. After remaining for a short time in this state, the cloth is allowed to become cold, or may be suddenly cooled by cold water, when it is to be withdrawn from the press. The cloth is then to be again folded in such a manner that those portions of the edges of the folds which were not subjected to pressure in the first instance, may be exposed to pressure in the second operation, which is to be completed in the same manner as the first. To prevent any marks, or impressions upon the cloth, from the edges of the plates, the cloth may be laid in folds of its full width, and made to extend together with the edges of the plates of metal by means of thin boards introduced between them, and of less superficial dimensions than the plates.

After undergoing the process, all sorts of woollen cloths are found to be rendered permanently more compact in texture, and consequently more serviceable in retaining warmth and excluding moisture, although comparatively more thin and light, whilst at the same time the cloth is rendered more smooth and glossy.

The improvement here claimed, and the advantages of this process over the usual mode of pressing woollen cloths, in a dry state, either cold, or with hot plates of metal, consist in the following circumstances, or parts—wool being a material very similar in its nature and properties to horn, (of which combs and other articles are formed,) if it be required to make any permanent alteration or impression on the texture of any fabric composed of it, the fibres of wool

must be rendered pliable by remaining immersed in hot water or steam. Whilst in this pliable and yielding state it may be easily compressed, or moulded to the desired form, and if allowed to become cold before this compression is removed, the form impressed will remain permanently. On the contrary, when pressed in a dry state the fibres of wool retain all their elasticity, and however intense the pressure may be upon them, they will soon recover their former position, and the effects will be transient.

ZACHARIAH ALLEN.

Specification of a patent for an improvement in Steam Navigation generally. Granted to JOHN M. PATTON, *Milton, Northumberland County, Pennsylvania, February 4th,* 1830.

To all to whom these presents shall come, be it known, that I, John M. Patton, in the county of Northumberland, and state of Pennsylvania, have invented a new and useful improvement in steam navigation generally, being applicable to steam ships, steam boats, &c. and particularly applicable to the navigation of canal boats by means of steam power.

This improvement consists in the use of a spiral or screw wheel, or wheels, to operate wholly under water—partly in the water and partly in the air—or wholly in the air, as resisting media, for the purpose of propelling or drawing the ships, boats, or craft of whatever description they may be, to which the said spiral or screw wheel or wheels may in any wise be attached for the purposes above specified; that is, to operate against air, or water, or both, and connected with steam power &c. for the purpose or purposes of propelling, or drawing ships, or boats, and craft of any description on any waters, or canals, within the United States. The spiral, or screw wheel is an *old invention*, and admits of a variety of construction, known to all practical and intelligent engineers, but as it is no particular construction, but the application of the spiral principle in all its various modifications to the purposes and in the manner above specified, that is claimed as a discovery, or new invention, hence I do not confine myself to any particular variety of the spiral, or screw wheel; to no particular dimensions, nor to the materials of which the same may be constructed; leaving myself full scope in the field of the mechanic arts to apply general and known materials and principles, in the construction of the spiral, as the nature of the case may require.

The preferable mode of applying the machine is believed to be at the stern of the vessel, or boat; the shaft of the spiral in the direction of the travel of the vessel, or boat; its size, the number of turns of the wing, or wings, of the spiral on the shaft, or whether the wing, or wings of the spiral be in a continued thread, or threads, or whether the same be formed in disjoined sections, embracing the spiral principle in any manner, is intended to be included in this specification,

and must be regulated to suit the power applied, and motion to be acquired. JOHN M. PATTON.

Remarks by the Editor.—We have never been more completely posed than in endeavouring to find out what the patentee claims to have invented in this, confessedly, "*old invention.*" Nothing certainly can be more vague and general than his description; nor can we well conceive how any one could have more completely overlooked both the letter and spirit of the patent law, which declares that "every inventor before he can receive a patent, shall deliver a written description of his invention, and of the manner of using the same, in such clear and exact terms as to distinguish the same from all other things before known, and to enable any person skilled in the art or science of which it is a branch, to make the same." Act of 1793, Sec. 3. Instead of distinguishing his *invention* from all other things before known, he seems to have embraced all things past, present, and to come, appertaining to the subject. More than twenty-five years ago Gen. Stevens, of Hoboken, near New York, tried the spiral wheel "at the stern of the vessel, or boat; the shaft of the spiral in the direction of the travel of the vessel, or boat," and abandoned it as a very inefficient mode of propelling, although he made the essay with all that skill and perseverance which have distinguished him and his sons in their numerous and valuable experiments. We do not recollect when the first patent was obtained in the United States for a screw, or spiral propeller, but we remember that when Wm. J. Lewis, Esq., of Virginia, obtained his patent, on the 3d of February, 1819, it was not the first which had issued for the same thing, and we know that several have since been obtained for using the *spiral principle*, both in a *continued thread* and in *disjointed sections.*

We think it unnecessary to refer to the several instances in which we have had occasion to allude to this mode of propelling since commencing our monthly analysis of the patents. We have distinctly given our opinion that the mode itself is a bad one in all its forms; an opinion founded on some knowledge of the nature of the fluid medium on which the propeller is to act, and confirmed by the best test in all such cases, the test of experiment, perseveringly repeated, and ingeniously varied, but uniformly resulting in disappointment. Our present object has been to point out the entire want of conformity with the law when descriptions and claims are couched in terms like the foregoing, which, we are convinced would render any patent unavailable, however valuable the invention might be for which it was taken.

Specification of a patent for preparing Straw, Hay, or other Vegetable Substances, for the manufacture of Paper. Granted to WILLIAM MAGAW, *Meadville, Crawford county, Pennsylvania, February* 19, 1830.

THE following endorsement has been made upon the specification at the patent office.

"Improvement in the manufacture of paper, for which two patents have been granted to the said William Magaw, one dated on the 8th day of March, 1828, the other the 21st day of May, in the same year; both of which patents being hereby cancelled on account of defective specifications." The new specification is as follows.

This improvement or discovery consists in the use of ley and its salts, in preparing straw, hay, or other vegetable substance, for the manufacture of paper, in the following manner, viz. To one hundred and twenty pounds of straw, or hay, take the ley procured from three or four bushels of ashes, or from fifteen to twenty pounds of the salts of ley, according to the quality; dilute it with a sufficiency of water to boil the straw or hay, which need not be all immersed at the commencement, as it will sink during the process of boiling. Boil the materials together until the vegetable matter and the knots become soft, or pulpy; or steep the materials in the solution several days until the same effect is produced; draw off the remaining liquid and rinse the materials to cleanse them from any dirt, or sediment, then grind them in the usual way, to be manufactured like rags into paper.

The petitioner claims as his exclusive improvement or discovery, the use of the ley, and its salts, and the mode of preparing the materials so as to render them fit for the manufacture of paper.

WILLIAM MAGAW.

Remarks by the Editor.—If straw had never before been used for making paper, its application to that use would undoubtedly present a legitimate claim to a patent; or if a particular mode of applying it to this purpose had been discovered and patented, an improved method would likewise entitle the discoverer to an exclusive privilege to use it. That Mr. Magaw's patent does not rest upon either of these circumstances, must, we think, plainly appear by a reference to what we have formerly said upon this subject. At page 416, new series, will be found the two former specifications, now surrendered, and a reference to a patent granted some years previously, both in France and England, for using the same material in the same manner. In our remarks upon Mr. Bomeisler's patent, page 415, vol. iv. we have also spoken fully upon this point.

As respects the surrender of the patents previously obtained, and the putting in of a new specification, we are at a loss to perceive what it is proposed to obtain by it in the present instance; all the difference which we see between the specification of May, 1828, and the present, consists in changing the proportion of the articles, and modifying the process by which they are used; but so slightly as not to have required a new specification; Mr. Magaw has judged differently, and his desire to make known that which he esteems the best mode of procedure, is praiseworthy. If, however, his claim was, in the first instance unfounded, as we believe to have been, what he has subsequently done cannot place it on a secure basis.

Specification of a patent for a composition called Leather Paper. Granted to EPHRAIM F. *and* THOMAS BLANK, *of the City of New York, February* 16, 1830.

THIS new and valuable invention or discovery, consists of the art of making a *paper* from the refuse parings or shavings of leather, which is peculiarly and admirably fitted for sheathing vessels; and which is believed to be superior to the sheathing paper, or leather, both of which are now in general use for that purpose. It may also (after suitable preparation,) be used for most of the purposes to which leather is applied, as the manufacture of patent leather, caps, pocket books, and for all kinds of book binding.

The mode of forming the patent *leather paper*, is similar to that of the manufacture of paper from rags. The shavings being ground, or beaten to a proper consistence, are put into a suitable mould, from whence they are taken to the press. The colour of this paper may be varied according to the quality of the shavings used, or by a chemical process. It may be brought to such a degree of fineness and whiteness as to be equal to the finest writing paper.

The subscribers claim the sole privilege of using their patent *leather paper* in the manufacture of *any article* to which leather or paper is applied.

EPHRAIM F. BLANK,
THOMAS BLANK.

Remarks by the Editor.—The making of sheets from the ground parings or shavings of leather, has been frequently attempted, in the way above pointed out. Some years ago it was stated in the public papers that a manufacture of the kind had been established in Germany, and the manufactured sheets applied to various purposes. We have seen specimens of such sheets made in the United States, and have no doubt that the experiment has been tried by many of our paper makers. The sheets so made want that toughness which results from the organized animal fibre in the unbroken skin. By means of size and pressure, a very good appearance may be given to such sheets, but still they will bear the same relationship to leather which paper bears to cloth.

ENGLISH PATENTS.

Specification of a patent to WILLIAM NORTH, *Surveyor, for an improved method of constructing and forming Ceilings and Partitions for dwelling houses, warehouses, workshops or other buildings, in order to render the same more secure against fire, July* 4, 1829.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that my said invention is described and ascertained in the manner following, that is to say, my improved method of constructing and

forming ceilings and partitions for dwelling houses, warehouses, workshops, or other buildings, consists, in applying, fixing, and retaining upon, or against the woodwork of such ceilings and partitions, certain flat tiles, which have been previously moulded, and formed of a composition which, when set and become dry, will sufficiently resist the action of fire.

Composition to make the tiles.—Take the dust of soft bath stone obtained from the chipping, and refuse small pieces made by masons in working such stone, grinding the same to powder by a suitable mill, of the kind called runners, on edges or rolling stones turned by a horse or other mill work; with the said dust of soft bath stone, mix half as much by measure, of Dorking quick lime, incorporating the lime and stone dust well together in a dry state; and to the mixture of quick lime and stone dust, add half as much by measure, of plaster of Paris, mixing the materials well together, and then beating up the composition with as much water as will give to the same the consistency of soft mortar, which, when well worked, is to be put into moulds and spread out in smooth layers therein, in the form of tiles, which if the materials are good and well mixed, will soon set hard enough to be removed from the moulds, and set up on edge to dry. The composition is therefore two parts by measure of Dorking lime, three parts by measure of plaster of Paris, and four parts by measure of dust of bath stone.

Moulds for forming the tiles.—These moulds are formed on the horizontal surface of a flat table or work bench, which is made very smooth, and long straight rails are fixed thereon parallel to each other, at such distances apart as to leave a clear place between them, equal to the intended length of the tiles, usually about twenty-four inches; other shorter rails are applied across between the long rails, their ends being fitted into notches cut in the long rails, the cross rails leaving clear spaces between, equal to the intended width of the tiles, usually fifteen inches; the thickness or height that all the rails rise up above the surface of the table, is equal to the intended thickness of the tiles, usually one and a quarter inches; each of the rectangular spaces thus bounded on four sides by the rails forms a mould, and the interior edges of the bounding rails are made to overhang on one side and one end, and to underhang at the opposite side and end of the same mould, in order to form the tiles with bevilled or rebated edges, that they may fit one to another by overlapping as hereinafter described. The inside of each mould is smeared with oil, and the composition being well mixed up to a consistency of soft mortar, is filled into the spaces between the rails; and certain iron staples, which are for the purpose of fixing and suspending the tiles as hereinafter described, are then imbedded in the soft plaster near to the edges of each mould; the staples are pressed down in contact with the boards of the table, but do not stand up high enough therefrom to reach through the thickness of the tiles within about one eighth of an inch; the composition must be well spread within the mould, and completely filled up to the edges of the rails with a plasterer's trowel, or other suitable tool, the upper surface being

worked very smooth therewith in order to give a finish to that side of the tiles which is to be downwards, if they are applied for a ceiling, or outwards, if they are applied for a partition; and if it be required to give the outsides of the tiles a finer surface, a thin layer of fine plaster may be spread over the same, before the mass of the tiles are set. If the lime and plaster are of good quality the tiles will soon set in the moulds, and then one of the long rails is taken up off the table, and all the cross rails are removed; and also by rapping upon the boards of the table with a hammer, in the spaces between the tiles, the jarring will cause the boards to detach from the undersides of the tiles, leaving them loose on the table, from which they may be removed and set edgeways to dry and harden ready for use. The oil which was applied upon the boards of the table, and the edges of the rails which form the mould, before the composition was filled in, by filling up the pores of the wood, facilitates the separation of the tiles from the boards and rails.

Fig 1 represents one of the tiles ready for fixing in its place to form a ceiling or partition, along two of its sides the edges *m n* overhang, and on the other two sides *o p* the edges underhang; in the longest of the overhanging edges *m*, two of the iron staples before mentioned were embedded at *r r*, at the time of moulding the tile; the claws or extremities *x x*, fig. 2, of each staple, being buried within the solid substance of the tile, so that the staples cannot draw out. The width of the tiles must correspond with the distance between the joists or pieces of quartering, or other woodwork forming the frame work for the ceiling or partition; and the tiles are to be applied against the woodwork, so that the sides of the tiles in which the staples are provided may correspond as nearly as may be with the edges of the joists or pieces of wood framing, as is shown in fig. 3; and a small iron hook, *e*, fig. 2, bent

Fig 1.

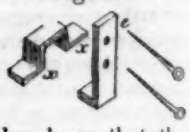


Fig. 2.

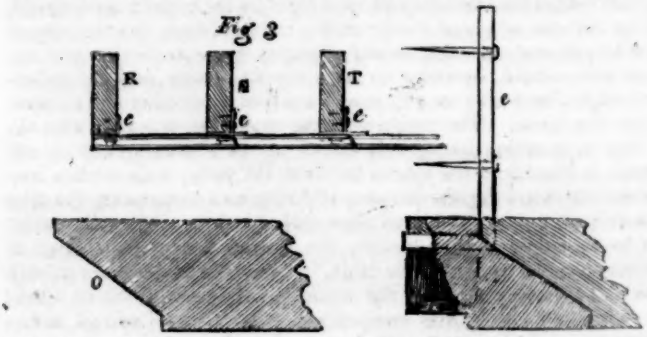
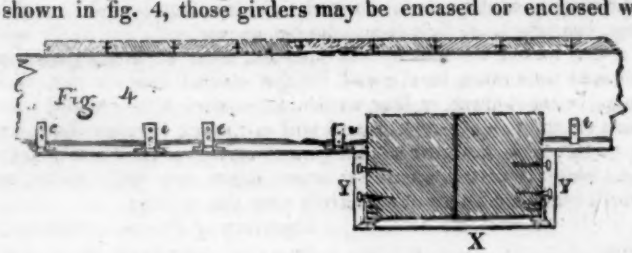


Fig 3

like the letter L is inserted with its short end into each of the

staples, and then the longer end, applying against the sides of the piece of wood is fastened thereto by a nail, or two nails, if need be; and by the said hooked or L piece, the tile is fastened against the wood; the first row of the tiles which is thus fixed or applied may require staples at the two opposite sides of each tile, in order to apply four hooks to fasten each tile, as shown at R fig. 3; but when one row of tiles is thus securely fastened the overhanging edges of those tiles will support one edge of the succeeding row of tiles, whereby two staples and two hooks to each tile will be sufficient to fasten them securely in their places, as shown at S and T fig. 3; or instead of four staples and four hooks to each of those tiles, that are put up in the first row at R, the first edges thereof may be fastened by nails or screws, put through the thickness of the tiles into the wood behind or above the tiles; also the last row of tiles which is put up must be fastened by means of nails or screws, put through the thickness of the tiles into the wood, behind or above the same, and the heads of such screws or nails, being countersunk deeply into the thickness of the tiles, may be concealed by filling up with the composition whereof the tiles are made, or with plaster.

For forming the ceilings in which there are large and deep girders, as shown in fig. 4, those girders may be encased or enclosed with



tiles of a suitable width; those at the underside of the girder at X having four staples in each at the opposite edges, for the reception of as many hooks or L pieces to nail up against each side of the girder; the edges of the tiles should overhang or project beyond the width of the girder at each side, as much as to afford a lodgment for the lower edges of other narrower tiles X, which are applied at the sides of the girders, and may be fastened thereto by nails or screws put through the thickness of those tiles into the wood; the upper edges of the narrow tiles Y fit up close beneath the tiles of the ceiling. The tiles in each succeeding row, or course, that is put up, are made to break joints, by putting up a half tile at the beginning of every other row or course next to the wall, or next to the girder, and a whole tile at the beginning of every intermediate row or course. The tiles, when dry, and ready to put up, are easily cut to any dimensions that may be required for those tiles, which are to fill up the spaces at the beginning and end of each surface in a ceiling or partition. The tiles having bevilled edges which overlap each other, leave no direct fissures through which flame or fire can penetrate, and by fixing one row of tiles with overhanging edges upon or behind which the underhanging edges of the next row are inserted, the latter

edges are thereby confined and retained in their places, the opposite or overhanging edges of the same tiles being fastened by means of the hooks and staples.

And my invention consists in the hereinbefore described method of fixing such tiles, viz.—by inserting staples into the tiles during the operation of moulding them, placing such staples in suitable positions to receive hooks or L shaped irons for the purpose of fastening the tiles to the wood work, and also in forming the edge of each tile in which there are staples overhanging, and the other or opposite edge underhanging, in order to interlock and fasten behind the adjacent edge of the tile next to it.

In witness whereof, &c.

Observations by the Patentee.—The fire proof ceiling here mentioned, is now in very extensive use at the St. Katherine docks, the ceilings over the whole range of quays being constructed on the principle described. Of the importance and great necessity for such an invention the numerous recent fires must convince the public. The tiles have been proved by the architect to St. Katherine docks, to be effectual in repelling the most raging fire.

Another advantage to be derived from the adoption of the ceiling above described, is, that it may be put up perfectly dry in the space of a few hours, whereas by the common mode of doing plastering, sufficient time must be allowed for the several coats to dry, which generally takes three or four weeks. It is much stronger and firmer than the common plastering, and will not crack through the shrinking or jarring of the timbers; this is sufficiently proved at St. Katherine docks, where immensely heavy casks are daily rolled and thrown upon the floors immediately over the ceilings.

[*Repertory of Patent Inventions.*

To John Morfit, *Bleacher, for an improvement on Retorts used by bleachers, and makers of oxymuriatic acid, or of oxymuriate of lime.* Dated 15th December, 1828.

The species of retort that Mr. Morfit prefers to use, is made of lead, of a cylindrical form, 4½ feet in diameter, 1¾ inch thick at bottom, one inch thick at the sides, which are 1¼ foot deep; this cylindrical part is covered at top by an obtruncated cone of the same thickness as the sides, inclined so as at its top to rise two feet above the bottom of the retort; the upper flat part of this top is about two feet in diameter (according to the drawing,) and is inclosed round its edges by two concentrical vertical rims, about 3 inches high and 1½ inch apart; and the cylindrical rim of a circular cover descends into the space between them, which, when used, has its junctures with the retort luted with a mixture of clay and water, and on its removal, affords a passage for cleaning out the whole.

The improvement on the retort, which is the object of this patent, consists in lining the internal surface of its sides with glazed tiles,

formed with that degree of curvature necessary for their contact with them, and having one of their upright edges grooved, and the other formed with an angular projection, so as mutually to clasp and adhere to each other, when set up in their places. These tiles the patentee directs to be made of the clay used for fire bricks, and glazed in the usual manner employed by potters; the crevices of their joints, when arranged in the retort, and that between them and the sides of the latter, are to be filled with powder made from the tiles by pounding or grinding. The dimensions of the tiles are not mentioned, but can be easily varied according as circumstances may direct; as may also the size and form of the retorts. The use of this improvement, is, to prevent the corrosion of the internal surfaces of the sides of the retorts, which is observed to take place when they are used for the purposes mentioned; and which are intended, by means of the glazed tiles, to be defended from the action of the oxymuriatic acid.

The retorts when at work, are suspended in brick work at a convenient height, by rims that project from the upper edges of their cylindrical bodies for this purpose: and into the hollow spaces left beneath them, and round about their sides, steam, or strongly heated air, is then admitted, to cause, by its high temperature, the oxymuriatic acid to pass over from the materials placed within them, into receptacles of the usual construction.

OBS.—The above contrivance seems one of considerable utility, and which may be also applied beneficially to the protection of retorts for the distillation of other acids that act on them, as well as that mentioned. We, however, have to object to the glazing directed for the tiles, being that *commonly* employed by potters, or in other words, the common glazing made by means of powdered galena, or lead ore; as most acids will act on it more or less; and instead of it, we recommend that the species of glazing employed for stoneware, or some other equally unassailable by acids, be used for these tiles. [*Ib.*

To CHARLES TURNER STURTEVANT, *Soap Boiler, for certain improvements in the Process of manufacturing Soap.* Dated May 26, 1829.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Charles Turner Sturtevant, do hereby declare the nature of my said invention to consist in a process whereby I am enabled to make pure alkaline lees unite with animal or vegetable matter in the soap copper, which therefore enables me use caustic alkalies instead of the crude alkalies, such as barilla, kelp, and the like, now in use for that purpose; thereby avoiding the residuum which is used in the process of black ash making, and which causes much waste of animal matter; and in further compliance with the said proviso, I, the said Charles

Turner Sturtevant, do hereby describe the manner in which my said invention is to be performed, as follows: that is to say, I put into the copper, in the first instance, a small portion of soap and water, and mix them well together, so as to form a saponaceous compound, to which I add a small quantity of tallow or fat, or oil, as the case may be, mixing it with compound, and adding thereto as much caustic soda lees as will be taken up by these materials without separating. In this manner I continue adding animal or vegetable matter as aforesaid, and caustic soda lees till the copper is full, gradually increasing the fresh doses of animal or vegetable matter and alkali in proportion as the quantity of matter in the copper accumulates, keeping the mixture well roused or stirred during the whole of the process; when this is accomplished, it is moulded in frames in the ordinary way. The best strength for the caustic soda lees I believe to be about one thousand two hundred and sixty specific gravity, and the temperatures used in the boiling may be the same as heretofore adopted; but I recommend the use of smaller coppers, and of an oblong shape, capable of containing from two to four tons, and I prefer their being heated by steam.

Now whereas I claim as my invention the following improvements, that is to say; first, using pure caustic alkaline lees in the soap copper instead of the lees now in use, thereby doing away with the residuum aforesaid; and, secondly, commencing the operation of boiling with the saponaceous compound aforesaid, and adding animal or vegetable matter and caustic alkali thereto in manner hereinbefore described till the copper is filled; and such my improvements being, to the best of my knowledge and belief, new, and never before used within that part of his said majesty's United Kingdom of Great Britain and Ireland called England, his said dominion of Wales, or town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same; and that I do verily believe this my said specification doth comply in all respects fully, and without reserve or disguise, with the proviso in the hereinbefore in part recited letters patent contained, whereof I do further claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

Observations by the Patentee.—In order to give the general reader a correct idea of the nature of the improvements, for which the above patent has been obtained, it will perhaps be convenient to say a few words upon the ordinary method of soap making. The composition of soap is well known to consist of animal or vegetable fat, soda and water in certain definite proportions. Although this fact has been well known, yet soap has never been made by uniting its constituent principles in a direct manner; but, in order to accomplish the combination, the crude alkaline lees obtained from barilla, kelp, &c., previously rendered caustic by an addition of quick lime, are boiled together with the fat in large cauldrons or coppers. As the lees contain considerable quantities of neutral salts and carbonate of soda, a very large quantity are requisite to saturate the fat, which renders

it necessary to perform the process of several operations or boilings. The lees, after having imparted their free caustic alkali to the fat, are drawn from the copper, and are then termed spent lees; they, of course, consist of the neutral salts and carbonate of soda, with a portion of the animal fat held in solution. In order to recover their alkaline parts, the spent lees undergo a process termed black-ash making, but which it is here unnecessary to describe; it is, however, an expensive process, and exceedingly offensive. On this account it is dispensed with in several manufactories; the spent lees are sold for a very trifling consideration, and in other cases even thrown away. Although the neutral salts form no part of the composition of soap, yet, according to the present method of making it, their presence in the lee is absolutely necessary; and in some cases where alkalies are employed, which either do not contain them at all, or in too small quantities, common salt is employed to supply the deficiency.

By referring to the preceding specification, it will be seen that, instead of requiring the presence of neutral salt in the lees, they are divested of that and all other extraneous matter, pure soda only being used, thereby rendering it totally unnecessary to put into the copper any thing that does not enter into the composition of the soap.

The advantages of this method will be easily perceived by those engaged in the manufacturing of soap; for, as there are no spent lees to withdraw from the copper, there can be no waste either of alkali or tallow, nor can there be any black-ash making; besides which, the principal causes that render soap-works so generally obnoxious are removed; and the process considerably shortened.

It is affirmed that this method of soap making is applicable to all the various sorts at present in use, and that the soap so made will suffer in no respect by comparison with those manufactured in the ordinary way.

The inventor flatters himself that as a pure soda can be most economically procured from the British alkali obtained from the decomposition of salt, a great extension of this article of domestic manufacture will prove a result of his improvements. [*Ib.*

FRANKLIN INSTITUTE.

Twenty-fifth Quarterly Meeting.

The twenty-fifth quarterly meeting of the Institute was held at their Hall on Thursday evening, April 15, 1830.

James Ronaldson, president, in the chair.

The minutes of the last quarterly meeting were read and approved.

The quarterly report of the Board of Managers, and also of the treasurer, were severally read and accepted, when, on motion it was resolved, that the report of the Board be referred to the committee on publications, to publish such parts as they may deem expedient.

The chairman of the Board of Managers read the following resolution, postponed at their last meeting, viz.

Resolved, that it be recommended to the Institute, at their next

quarterly meeting, to cause the rooms recently occupied by the United States court, to be fitted up as a reading room for the use of the members, and to cause the library, minerals and models, to be arranged therein, and that they be requested to adopt measures for raising funds to defray the expenses of said arrangement.

Whereupon, the following resolution passed, viz.

Resolved, that the recommendation of the Board of Managers, that the rooms in the Hall of the Institute recently occupied by the circuit and district courts of the United States, be fitted up for a reading room for the use of the members, and for the library and the cabinets of minerals and models, be adopted.

Resolved, that a committee of fifteen members be appointed with authority to collect subscriptions for the purpose of fitting up the rooms.

Resolved, that said committee be instructed to have the rooms prepared, and give public notice thereof to the members.

Whereupon, the following gentlemen were appointed on the committee.

Messrs. Samuel V. Merrick,	Samuel J. Robbins,
Abraham Miller,	M. W. Baldwin,
James Hogan,	James Baker,
John S. Warner,	David S. Brown,
Thomas Fletcher,	William S. Perot,
William A. Blanchard,	E. W. Keyser,
John W. Henry,	Isaiah Lukens.
George W. Smith,	

Resolved, that the above committee act in conjunction with the library committee, and prepare such rules for the government of the reading room and management of the library, as they may deem expedient, and report to the next quarterly meeting of the Institute.

Resolved, that the committee on publications be instructed to exchange the Journal of the Institute for periodicals and newspapers, as extensively as possible.

James Ronaldson, *President.*

Isaac B. Garrigues, *Recording Secretary.*

Twenty-fifth Quarterly Report of the Board of Managers of the Franklin Institute.

The Board of Managers, in compliance with the directions of the constitution, submit a report of their transactions for the first quarter of the present official year.

Of the various enterprises that have been undertaken by the Institute, the experiments for the determination of the value of water as a moving power, hold the first rank, whether we consider the importance of the subject to the country, or the credit that its successful determination will obtain for the society. The immense capital that is invested in manufactories, the machinery of which is

moved by water, the little that is known of the most economical and advantageous mode of applying and estimating the value of this power, would justify the hope that ample funds could be procured. The consideration that in Europe, with all the advantages of large capital, profound science, and royal patronage, so little has been done to determine this question, should encourage the society to persevere in their arduous undertaking, and by prosecuting it to completion, secure to the country the merit of determining this important subject. The committee entrusted with the prosecution of these experiments have recommenced their labours with zeal, and have nearly completed a series of very judicious and ingeniously contrived experiments on a wheel 20 feet in diameter. They have already arrived at very interesting results, which will shortly be laid before the society. But while their success thus far gives them every encouragement to persevere, they will be unable to carry the experiments to the contemplated extent unless further funds shall be placed at their disposal. The mere statement of this fact will, it is hoped, induce those interested in the subject to contribute the necessary funds.

Since the last report, an arrangement has been made with the Marshal of the United States for this district, by which the rooms lately occupied as a court room and offices, have been relinquished to the society. This arrangement places at the disposal of the society an elegant and spacious room, admirably fitted for a library and reading room, and for the monthly and quarterly meetings of the Institute. Resolutions of the Board are herewith submitted, recommending that these rooms should be fitted up for the above purposes, and that the society should take such measures as may be necessary to defray the expenses thus incurred. It cannot be doubted that great benefit will be derived from presenting to the intelligent artisan and mechanic, the use of a well furnished library, and cabinets of models and minerals, and affording him an opportunity for associating daily with gentlemen of all professions, willing to communicate the knowledge they have acquired, and anxious to learn from others that which they are not fortunate enough to know. The Managers of the Institute appeal with confidence to the members for means to carry these plans into effect, being convinced that they will advance its prosperity and place it in that elevated rank amongst its fellow labourers in the field of useful knowledge to which it is entitled, by the general utility of the objects of its attention. In the library and reading room, the Board look for a revival of the spirit which actuated the members of the Institute in the early part of its existence, when the great number of contributors warranted the commencement of all the objects embraced in its plan.

We are in possession of the elements of a library, and a cabinet of models and minerals, which we hope will be enlarged by the liberal contributions of the members, and soon rendered extensively useful to the institution.

The courses of instruction in the lecture room and drawing school, for 1829–30, have terminated, and the satisfactory evidence of their

just appreciation, which has been afforded by the regular attendance of numerous classes, cannot fail to convince the most incredulous of the benefits which flow from these departments of the Institute. To the kindness of Peter A. Brown and James R. Leib, Esqrs. and Dr. John T. Sharpless, we are indebted for a series of highly interesting volunteer lectures, and it is hoped that the good example which has been given by these gentlemen will cause many of the members of the Institute to cast their share into the treasury of useful knowledge.

To the exhibition announced to be held in September next, the attention of the members is ardently desired as a means of promoting not only the interests of the institution, but of exhibiting to the world that we are still engaged in fostering the useful arts. The list of premiums embraces a number of articles for which we are now dependant on foreign countries, and to the production of which both our climate and our manufacturers are fully competent.

All which is respectfully submitted.

S. V. Merrick, *Chairman.*

William Hamilton, *Actuary.*

Monthly Meeting.

The stated monthly meeting of the Institute was held at their Hall on Thursday evening, March 25, 1830.

Professor Alexander Dallas Bache, was appointed chairman.

The minutes of the last meeting were read and approved.

The following donations were presented, viz.

Major N. Ware presented *Treadgold on Rail-ways.*

Mr. Judah Dobson presented *The Mechanic's Assistant.*

Thomas P. Jones, M. D. presented *The Speeches of Daniel Webster, delivered before the Senate of the United States, on the 20th and 26th of January,* 1830.

The Speech of Mr. Hayne, delivered 21st of January.

The Speech of Mr. Sprague, delivered 3d of February.

Mr. William Hamilton presented *A Map of the City of London.*

Mr. Rufus Tyler presented *A Large Concave Mirror.*

Various Specimens of Minerals were added to the cabinet by donations from Messrs. William Pendleton Orrick, of Reading, Pa. Gratz Etting, Centre county, Pa.; George Merrick, City of Philadelphia; Samuel B. Fales, City of Philadelphia; Isaac Doolittle, Bennington, Vt.

The corresponding secretary laid on the table the following works received in exchange for the Journal of the Institute, viz.

The North American Review, for January, 1830.

The American Quarterly Review, for March, 1830.

The American Journal of Education, Nos. 42, 43 and 44.

The American Farmer, Vol. 11.

London Journal of Arts and Sciences, for January, 1830.

The London Mechanic's Magazine, for November and December, 1829.

The London Journal of Arts and Register of Patent Inventions, for January, 1830.

Gill's Technological and Microscopic Repository, for Jan. 1830.

Bulletin de la Société d'Encouragement pour l'Industrie Nationale, for October and November, 1829.

Annales de Chimie et de Physique, for October and November.

Journal Universel des Sciences Médicales, for October.

Recuiel Industriel, for September.

Bibliothéque Physico-economique, for November and December.

The committee on inventions presented a report on Mr. William Woodworth's machine for planing, tongueing, and grooving boards, &c., and also a report on Mr. Benjamin Tanner's improvement for preventing alterations in bank checks, &c., styled "Stereograph Plates," which were severally read and accepted.

Professor Franklin Bache submitted a paper in reply to the query, what is the rationale of the action of hydrogen gas on sponge platina, as discovered by Doebereiner? which was read, and on motion referred to the committee on publications.

A communication was read containing the following queries.

Suppose an iron pot be dropped into the sea, with its mouth downwards, and one cubic foot of inclosed air by its buoyancy prevents it from sinking; the addition of one pound of the same metal places the vessel in an equilibrio at the surface, but two pounds being added it sinks.

1st. If it descends in an upright position so as to prevent the escape of air, and it be not intercepted by the bottom of the sea, at what depth will it become stationary?

2nd. At its stationary depth will the removal of the extra two pounds weight cause the vessel to rise again to the surface? On motion the above was placed on the list for discussion.

Extract from the minutes.

ALEXANDER DALLAS BACHE, *Chairman.*

ISAAC B. GARRIGUES, *Recording Secretary.*

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

Remarks on Mr. J. P. ESPY's *communication in the number of this Journal for February last, relative to the power required to Propel Carriages on Rail-roads, compared with that for moving boats on Canals.*

IN treating on such subjects of general and immediate interest as those in the article referred to, great care is necessary least any thing should be said calculated to lead to an incorrect conclusion. Although the article in question possesses much merit from the general soundness of the principles advanced, yet some important circumstances appear to have been entirely overlooked by the writer, which it is my purpose to bring into view. Mr. Espy has shown that if the carriage invented by Mr. Winans be used, the tension of

the rope by which it shall be drawn will not exceed one pound to a thousand pound load, and that it will not be increased by any increase of velocity; that this tension will move the same weight in a canal at the rate of one and six-tenths mile per hour; that a double velocity, or three and one-fifth miles per hour will give four times the resistance, increasing the tension of the rope from one to four pounds; and finally, at 32 miles an hour the tension will be 400 pounds. He then gives the following example: "suppose the power to be estimated by the quantity of coals consumed in transporting a given weight with the various velocities mentioned above, it will be found, if the velocity is one mile and six-tenths an hour, the quantity will be the same on the canal as on the rail-road; whereas, if the velocities are 16 miles an hour, the quantity consumed on the canal will be 100 times greater for every mile and one-sixth, while that on the rail-road will remain exactly the same. Now when it is recollected that a very great velocity cannot be obtained at all on canals, and that a velocity of 20, or even 30 miles per hour, can be obtained on a rail-road with no greater expenditure of coals per mile," (or what is the same thing, the expenditure will be the same in the same distance whether performed in equal or unequal times,) "than would be required on a canal with a velocity of $1\frac{6}{10}$ mile per hour, we may predict with the greatest confidence, that canals, in a few years, will be entirely supplanted by rail-roads."

This paragraph would lead the reader to suppose that the writer intended to convey the idea, that if half a pound of coals would move a ton of goods by canal one mile at the rate of one and six-tenths mile an hour, that half a pound of coals will move a ton of goods by rail-road one mile, when going at the rate of 30 miles an hour. If this be his meaning then I think he is in error, inasmuch as all the weight to be moved cannot be *goods* in either case, nor can the goods bear the same proportion to the engine that can move itself and the goods at the rate of 30 miles an hour, as the goods bear to the engine that can move itself and the goods at the rate of one and six-tenths mile per hour on the canal, or on the rail-road.

Example.—Suppose an engine and its appurtenances which weighs 4 tons, will, in addition to its own weight, draw a train weighing 80 tons, the whole weight will be 84 tons, moving at the rate of $1\frac{6}{10}$ mile an hour with half a pound of coal per mile, for each ton; the distance, 30 miles, will be performed in 18.75 hours with 1860 lbs. of coals. Then if this engine requires 18.75 hours to generate and apply a quantity of power that can overcome the whole resistance of 84 tons in 30 miles, is it reasonable to expect it to do as much in one hour? the answer certainly must be no; it will require an engine whose power shall be 18.75 times greater, and, consequently, 18.75 times heavier. Thus the weight of the first engine, 4 tons $\times$ 18.75 = 75 tons, it then follows that the load must be diminished as much as the weight of the engine is increased, thus 75 + 9 = 84 tons, hence the weight of the goods and car on which they are laden can be no more than 9 tons. If the weight of the car be 3 tons, we have 6 tons of goods conveyed 30 miles with 1260 lbs. of coals = 210 lbs.

to the ton. In the first case, the goods, and cars on which they were laden, was 80 tons, from which take one-third; for the weight of the cars we have 53.2 tons of goods conveyed 30 miles with 1260 lbs. of coals = 23.6 pounds per ton. It may be proper here to remark, that the weight of canal boats is much less in proportion to the load they carry than that of rail-road cars to their loads.

The operations of locomotive engines on straight and level rail-roads, can be estimated with more certainty than on roads that are curved and have frequent ascents and descents in their line; the power of the engine being always equal in equal times, the velocities at which they will move may be expected to vary as do the resistances, and the sum of power required to move a load 100 miles will be much greater on a curved, and undulating, than on a straight and level line.

Example: suppose the resistance to a locomotive engine and its train on a level road to be one pound to one thousand, which arises chiefly from friction of the axles; if they encounter an inclined plane of one foot rise in 200 feet, on which the opposing gravitating force of the train will be as the perpendicular ascent is to the length of the plane, viz. 1 pound to every 200 pounds, or 5 to 1000, making the whole resistance 6 pounds to 1000; then suppose the velocity on the horizontal plane 20 miles an hour; when it ascends the inclined plane the velocity will diminish as the resistance increases, viz. from 20 to 3.3 miles an hour, which would be performed without any increase of elastic force of the steam or delay at the foot of the plane, provided the connexion of the engine with the carriage be so arranged, that as the resistance of the road increases, the gear of the engine by some suitable contrivance may be so altered, as that an uniform resistance will oppose the motion of the engine, which thus circumstanced, would remain equable, whatever may be the retardation of the carriage by encountering an ascending plane; but without an arrangement by which this would be effected, the velocity of the carriage will be more variable than the resistances; and the strength, and consequently the weight of the engine as compared with the goods, must be much increased.

Example: when a train weighing 80,000 pounds, engine included, arrives by a level road at the foot of an inclined plane, at a velocity of 20 miles per hour, the force of the steam, say 50 lbs. to the inch, equals the resistance on the level road, viz. eighty pounds, it must be evident that this force cannot overcome 480 pounds, which is the resistance on the inclined plane; consequently, were it not for the momentum of the moving mass, the whole would suddenly come to rest, until the force of the steam shall have time to increase from 50 to 300 pounds to the inch, which would then be equal to the resistance, when the carriage will be moved to the top of the plane at the rate of 3.3 miles per hour: should the next section of the road descend more than one foot in 1000, the carriage will descend by gravity alone, hence all the accumulated steam, as well as that generated while passing down the plane, must be lost, should the next section of the road be level, as no more than 50 pounds pres-

sure can then be used; it is also plain that the engine and boiler must be five times stronger, and consequently much heavier than would be necessary if the whole road was level; hence it follows, that the power required to travel a given distance on an undulating road will exceed that necessary in the same distance on a level road, as much as would be required to raise the whole train perpendicularly, to a height equal to all the elevations in the road taken together, whether the termination be at a higher or lower level than the commencement. As some conditions of a descent may occur, that will in part compensate an ascent, the above rule may not hold good to the full extent. Although in passing from one level to another when travelling upon canals, detention is unavoidable, the power employed is provided at the erection of the canal itself, and neither requires coals or horses to effect the purpose. I am by no means opposed to rail-roads, but on the contrary anticipate their affording great facilities in transportation, and believe that they will do so, even where a moderate speed only, say 5 miles an hour, may be necessary; at the same time, I am compelled to differ materially from Mr. Espy in my estimate of the amount of advantage that they will be found to afford over canals, inasmuch as I think that the speed at which the expense of the two modes of travelling will be found to be equal, will be between 3 and 4 miles instead of $1\frac{6}{10}$ miles an hour, as he supposes, and consequently that travelling at any speed less than 3 miles an hour, will be cheaper by canals than by rail-roads; and therefore that canals should not be abandoned, until rail-roads shall, in practice, be proved to be superior to them for all general purposes.

Abstract of a memoir upon the Bones procured from Butcher's Meat.

By M. D'Arcet, Member of the Academy of Sciences.

We propose, in this memoir, to call the attention of the administration, and to enlighten public opinion upon the use of the gelatine of bones, considered as an alimentary substance. The long and difficult investigations which we have undertaken with this view since 1812, have enabled us to trace to its foundation the economical question; and we are inclined to believe, that in a few years, bones, so rich a source of nutritious matter, will take the rank they so well deserve among the animal substances employed for the nourishment of man.

We submit this work to the judgment of the enlightened persons who devote themselves to the relief of the indigent classes. We are desirous that they should approve of the result of our labours; and we hope that they will give us their support, in order that we may obtain the useful objects that we have in view.

Bones ought to be divided into two classes. Those which are compact, flat, or cylindrical, contain very little fat. They are sold at very high prices to the turners, button makers, and fan makers: they ought to be laid aside and kept for these purposes.

The other bones which remain after these have been selected, and among which are found the spongy heads of the large bones, and the

end of the flat bones, are those which ought to be employed for the alimentary substance. Numerous analyses have shown us that these bones when dry contain in 100 parts, about

Earthy substance, - - - - -	60
Gelatine, - - - - - - -	30
Fat, - - - - - - - -	10

The heads of the large bones contain as much as 50 per cent. of fat. It is remarked that the bones of mutton and the bones of roast meat give often very rancid fat, or fat smelling of tallow, and that they ought to be laid aside and managed separately.

One hundred kilogrammes (220 lbs.) of bones contain 30 kilogrammes (66 lbs.) of gelatine; and since ten grammes (.353) of gelatine are sufficient to animalize a half litre (about 1 pint) of soup, at least the best household soup, one kilogramme (2.2 lbs.) of bones is sufficient to prepare 30 basins of soup of one demi-litre, (1 pint;) but one kilogramme (2.2 lbs.) of meat will only furnish 4 basins of soup, from whence it follows, that the equal weight of bones supply to water seven times and a half more animal matter than meat.

One hundred kilogrammes (220 lbs.) of butcher's meat contain about 20 kilogrammes (44 lbs.) of bones. This quantity of meat making 400 basins of soup, and the 20 kilogrammes (44 lbs.) of bones making 600, we see that by extracting all the bones procured from the given quantity of meat, three basins of soup can be made with the bones, while the meat and the bones united actually give but two.

With the bones contained in the meat consumed in the single department of the Seine, we could prepare more than eight hundred thousand basins per day.

The gelatine of the bones can be extracted by submitting them whole to the action of steam; but the operation would be tedious, even though there were no risk of changing the nature of part of the gelatine in making use of the steam strongly compressed, and it is better to bruise them: but some precautions are necessary. The bones must not be broken by redoubled blows, because they contract thereby a very disagreeable empyreumatic smell. They must first be soaked as much as possible, and then broken by a single blow, in passing them through two grooved cylinders, or under a mall sufficiently heavy. On a small scale, we may make use of a dish and mass of wood, both covered with an iron plate cut into diamond points. In either, care must be taken to soak the pieces of bones which are to be broken again, in water. They ought to be used immediately after, or else kept plunged in fresh water, or what is better, water almost saturated with salt. The bones subjected a short time after to steam strongly condensed to a dry heat of 130° to 140° break very easily; but this process is subject to the inconveniences of detaching part of the fat, and it should only be employed upon those which do not contain any fat, or upon old and dirty bones.

The preservation of bones as an alimentary substance, is of the highest importance, as they easily putrify.

A portion of the gelatine changes into ammonia, and this, by combining with the gelatine not decomposed, takes away its property of turning into jelly by cold, and makes it soluble in cold water.

Various methods of preservation have been tried. In all cases we should begin by depriving the bones of the fat, or else they acquire in time a rancid smell, which renders them useless.

The broken bones boiled in a copper with water furnish a great deal of fat, but they still retain enough to turn rancid. It has been proposed to remove the remaining fat, by saponifying it with soda, but the success has not been complete, the gelatine is often altered, and retains a disagreeable smell of soap, the salting which can be applied over the first bones is preferable, if on a great scale it is not too expensive, and if the products are as agreeable as in the fresh state.

The method which appears to succeed best, is that for the preservation of meat, invented by M. Plowden, which consists in immersing the meat in a strong solution of the juice of meat, or of gelatine, and then drying it in the open air. I took a solution of gelatine containing about 20 per cent. of dry gelatine: I heated it to 80° or 90° (about 170° or 190° Fah.) and dipped into it, several times, the clear bones, broken into small bits and deprived of their fat. The bones when taken out of the solution of gelatine are put to dry in the open air, and then treated once or twice in the same manner, to increase the thickness of the layer of gelatine. It is followed by a perfect desiccation in a stove of 20° or 25° (70° to 80° Fah.)

The extraction of the gelatine of bones is yet but imperfectly known, and demands particular attention. It appears that the first attempt was made by Papin, who proposed, in 1681, to employ condensed steam for this purpose; but the gelatine obtained by this process was almost always altered, had a disagreeable empyreumatic smell, and was no longer a jelly.

The boiling rasped bones with water under the pressure of the atmosphere, has not the same inconvenience, but the operation is long and expensive, and the bones do not give out nearly the quantity of gelatine which they can furnish.

About 15 years ago, I discovered the art of extracting the gelatine of bones by means of acids. The happiest results were obtained: and if the direction of it had been placed in able hands, there is no doubt that the preparation of gelatine as an alimentary substance would, since that time, have acquired the greatest extension.

In considering about the same period the inconveniences of Papin's method, I was enabled to overcome them by modifications. The process which appears to me the most advantageous, is that of exposing the bones to the action of steam having a weak tension. Its success is caused by the steam condensing in the pores of the bones; it expels the fat and then dissolves successively all the gelatine. This is merely the repetition of an old pharmaceutic process now forgotten, but which may be found quoted in the Pharmacy of Baumé, p. 108, edition of 1790.

The presence of fat in the bones makes the process complicated. This fat becomes acid by the carbonate of lime which forms an insoluble soap, which prevents the solution of the gelatine. It follows in consequence that the bones are deprived of this fat before the gelatine is separated.

We come to this result by boiling the broken bones in water in a

copper uncovered, as is usually done, or by exposing them first only to the steam not condensed. The extraction of the gelatine by steam little condensed requires at least 4 days to complete it. The broken bones deprived of their fat or not, are placed in a cylindrical basket of tinned iron-ware filling almost entirely the capacity of a metallic cylinder in which it is held suspended.

This being closed, steam of a weak tension is introduced which melts the fat, and dissolves a little of the gelatine. We then increase the tension. The liquids are drawn off in a cylinder by means of a cock placed at one end; the gelatine solution is obtained more or less concentrated according to the rapidity of the condensation of the steam, and the smallness of the bones. The following are the principal circumstances which it is necessary to observe. 1st. The bones ought to be broken into thin pieces; they should be bruised if they are thick and full of fat, and be drained the more rapidly, or at a lower temperature.

2nd. The broken bones ought to be deprived of their fat previously, either by means of boiling water in a common boiler, or else in the cylinders, introducing steam not condensed, or perhaps water heated by means of steam.

3d. The steam of the water ought to be so much condensed, and the period of the operation so much more prolonged in proportion as we would wish to obtain the gelatine pure, and of a strong jelly.

4th. There would be more economy in preparing the gelatine solution much concentrated, and then bringing it back to a convenient strength, by mixing it with hot water. To obtain this result, care must be taken to moderate the condensation of the steam in the apparatus.

5th. The degree of tension which best suits the steam is that of 9.60 milimetres of mercury, which corresponds with a temperature of 106° to 107° (223° to 225° Fah.) The cocks placed upon the pipes which conducts the steam into the apparatus, allowing the tension to be varied at will, and to be maintained uniformly.

The solution of gelatine comes from the apparatus perfectly clear, if it does not rush out impetuously with the steam. As it is without flavour it can be used as an alimentary jelly, by the addition of sugar or aromatics, as convenient. Reduced till it contains only 2 per cent. of gelatine, it is as much impregnated with animal matter as the best household soup, and may be used either to animalize food of a vegetable nature, or as a substitute for soup, after being salted, coloured, and aromatized. The salt which gives the most agreeable flavour, according to the interesting remarks of M. Braconnot, is a mixture of 70 parts of marine salt, and 30 of chloride of potassium. Evaporated when it comes out of the cylinder, after being seasoned with herbs or the juice of meat, we obtain either cakes of gelatine or cakes of soup. Their uses are numerous, and it is easy to perceive all the advantages of this most salubrious alimentary substance. The fat contained in the bones turns into soup very quickly when it is exposed to the action of compressed steam. It is advantageous to take off the fat with boiling water, or even at a lower temperature, for the fat is much better if exposed to a lower heat. The bones

give out their fat very quickly in steam a little condensed; but the quantity of fat changed into soup, and which remains in insoluble combination with the lime, rises to 4 or 5 per cent. of the weight of the bones used, and such a loss ought to be avoided.

An apparatus composed of four cylinders is established at the Hospital de la Charité. Each cylinder is 1 m. (3⅓ feet) in length and 0 m. 333 (1⅛ foot) in diameter, and contains about 40 k. (80 lbs.) of bones, furnishing about a thousand basins of soup a day. The importance of the work of M. D'Arcet has induced us to give an abstract of the principle part of it, for further details we must refer our readers to the original memoir printed in the Annals of Industry for Feb. 1829. [*Brande's Quart. Journ. Jan.* 1830.

In the application of the method just given at the Hospital de la Charité, on a large scale, practical difficulties were encountered, which have been obviated by the author in the manner explained in the following note from the Recueil Industriel, September, 1829.

The use which has been made of the apparatus already described at the Hospital de la Charité has led to an improvement which I regard as very useful; I hasten to publish a note on this subject in order that those using the apparatus in question may avoid the difficulties which I encountered while using cylinders of a great capacity.

I said that the quantity of water condensed in the cylinders might be varied by giving them a considerable surface, by depriving them of polish, and by baring the surface, or by cooling them in any other suitable way. Since then experience has shown me that the steam must be condensed near the axes of the cylinder, and not at their surfaces; I have applied a method of so doing to the apparatus at the Hospital de la Charité, which has succeeded. This improvement is as follows.

I bring cold water into each cylinder above the bones and in the middle of the cage which contains them; this water which flows from an elevated reservoir, comes drop by drop, and only in a sufficient quantity to produce with the water from the steam condensed in each cylinder precisely the number of rations of the gelatinous solution which the apparatus should furnish. This water reaching the surface of the bones which are raised at the temperature of 106° (223° Fah.) is soon warmed, it mixes with the water from the condensed steam, trickles through the bones, dissolving the gelatine as fast as it becomes soluble.

The pipe through which cold water is introduced into the axis of each cylinder is provided with a stop cock to regulate the quantity of water delivered.

On various Improved Pastes and Lutes. *By* Thomas Gill, Esq.

Bookbinder's Paste, of Wheaten Flour and Alum.—The bookbinders are in the habit of making a considerable quantity of paste at once, and it takes a long time to incorporate the wheaten flour and the water together, in the usual manner of doing it; Mr. W. H. Kelly, our bookbinder, has, however, greatly shortened this time,

by adopting the following improved method. He first mixes the flour with cold water, to the consistence of thick batter; then, having a measured quantity of water boiling hot, in a tea kettle, in which a proper quantity of alum had been dissolved, by putting it into the water cold, and boiling it, he adds a little of this boiling alum water, by degrees, to the batter, stirring it well in, till he sees the effect it has produced on the flour, by a change in its appearance, when he suddenly pours the remainder of the boiling water into it, and also stirs it well all the while. In this way he soon makes the whole into paste; whereas, on the old plan of mixing it with cold water, and then boiling it, it occupied a whole day in breaking down the lumps which formed in it.

Lute, or Paste, of Albumen and Wheaten Flour.—The Editor lately found an ingenious copper-smith fitting together the inside joints of a distilling apparatus, by putting between the shoulders of them, stout hempen cloths, coated on both sides, with a thick mixture of wheaten flour and the whites of eggs (albumen,) made in the cold. In this judicious way, and without tainting the flavour of the alcoholic liquors, to be distilled in the apparatus, he employed a lute, which, instead of dissolving in the hot vapours, on the contrary was hardened by them. He employed a thick mixture of white lead ground in oil, to coat the exterior of his joints as usual.

The late Mr. Samuel Varley's Chemical Lute.—This consisted of wheaten flour, mixed with cold water, to which he added a portion of common salt. On applying a little of this lute, either to close the joints, or to stop the issue of vapours in distilling, the heat instantly acting upon the flour, changed it into a thickened paste, which had the desired effect. As, however, it might have been difficult to unlute the apparatus, after the operation was finished, so the salt was added to the lute, by way of introducing water into it, to soften it.

Paste of Wheaten Flour and Rosin.—A German manufacturer of ladies' work boxes, jeweller's trays, &c., was in the habit of lining them with morocco leather, velvet, or paper, with a paste composed of wheaten flour mixed up with water, and boiled; and whilst boiling, he incorporated a quantity of black rosin with it, which greatly improved its strength, and prevented it from being so easily affected by moisture. He finished it by straining it through a coarse cloth, and thus removed all the lumps in it.

Paste of Wheaten Flour and Wax.—A Mr. Mayhew informed the Editor of this improved paste, many years since, and which he made in the following manner. After boiling a mixture of wheaten flour in water, to form a paste as usual, he stirred a piece of wax candle round in it a few times, and which, mingling with the paste, greatly improved its binding quality. The Editor made some of it, and found it to have acquired a saccharine taste, from the union of the wax with the flour.

Paste of Bean Meal.—Mr. Boyle Godfrey, in a chemical work published by him many years since, says, that a paste composed of bean meal and water, may be usefully employed in closing letters, and that such closures cannot possibly be loosened by directing the

steam of boiling water upon them, as would be the case when the ordinary wafers were so treated.

Clay's Paste, of Wheaten Flour and Gelatine.—The paste by which the sheets of whited brown paper were so firmly held together, in the celebrated Clay's, of Birmingham, japanned paper tea trays, &c. was a composition of wheaten flour and carpenter's glue boiled together. Each sheet of paper was united singly to the others by this paste, the air being carefully driven out from between them by wiping with a coarse cloth from the centre towards the sides; and they were carefully dried in stoves, after the putting on of each layer. Thus combined, they might be sawn, planed, nailed, and glued together, in the manner of wood; but the articles were much lighter and stronger, when japanned, than if formed of wood.

[*Technological Repository.*

Additional Remarks on the Stowage of Ships. *By* Commander John Pearse, R. N.

My former remarks (see vol. iv. page 145,) were written with the intention of endeavouring to show that we have no regular system for stowing our ships, and that an alteration in the distribution of the weights is necessary. Subsequent to their publication, I have seen an authentic calculation of the weight and pressure, according to the ordinary distribution in a modern 74 gun ship. This has induced me to publish these additional remarks, by which I shall be enabled to prove that the alterations I proposed would materially contribute to remedy the inequality of the weight and pressure represented in the calculation alluded to; and which is referred to in the following observations of Dr. Young's, in his remarks on the employment of oblique riders. *Philos. Trans.* 1814.

"It is unnecessary to explain here the well known inequality of the distribution of the weight and pressure, which causes almost all ships to have a tendency to arch or hog, that is, to become convex upwards, in the direction of their length. It is possible that there may be cases in which a strain of a very different nature is produced; but in ships of war this tendency appears to be universal.

"It is, however, very different in degree in the different parts of a ship; and, of course, still more different according to the different modes of distribution of the ballast and stores, which may occur in different ships; but, in ordinary cases, it will probably be found nearly such as is represented in the calculations subjoined in the note,* deduced from data, which have been obligingly furnished by an acute and experienced member of the Navy Board."

* "In a modern 74 gun ship, fitted for sea, the length being 176 feet, the breadth 47½, the forces are thus distributed.

Aftermost	49 feet	Weight 699	Pressure 627	Difference 72 tons.
Next	20	297	405	— 108
	50	1216	1098	118
	20	290	409	— 119
	37	498	461	37
	176	3000	3000	000

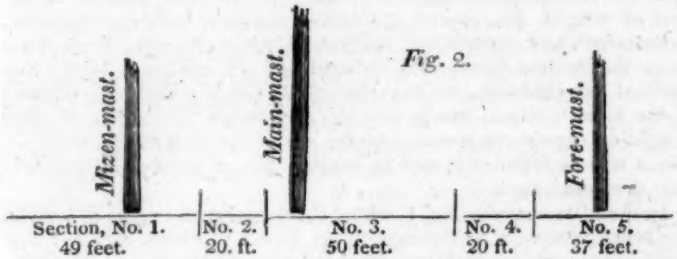
By the above calculation, it will appear that there is an excess of weight at both extremities, and that in the adjoining sections the pressure greatly preponderates. Consequently, these forces are opposed to each other, and in a direction very prejudicial to the ship; as it is not only the evil of weight preponderating at the extremities, the power of which will be increased by the action of the ship, but from the formation of the body at those parts they can afford but a feeble resistance to so great a force.

Perhaps the following figures will best explain where the weights and pressure now preponderate, what particular weights may be supposed to cause an excess, and such as may be most conveniently and advantageously transferred.

Fig. 1.

Excess of weight 72 tons.	20 feet.	Excess of weight 118 tons.	20 feet.	Excess of weight 37 tons.
49 feet.	108 tons Excess of pressure.	50 feet.	119 tons Excess of pressure.	37 feet.

Fig. 2.



Section, No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
49 feet.	20. ft.	50 feet.	20 ft.	37 feet.

Figure the 1st represents the length of a 74 gun ship, divided into five sections, and the excess of weight or pressure in each.

Figure the 2nd also represents the length, divided into sections and the positions of the masts, by which it will be seen that they are situated in those parts where the weights preponderate; and that they greatly contribute to it is a very natural conclusion.

In the foremost section there is, unavoidably, not only the weight of the foremast and its rigging, but the bowsprit and anchors also; the latter stowed at the extremity of the section, and the bowsprit projecting considerably beyond it; which, on the lever principle, assisted by the action of the ship and the excess of weight, and being situated in a part which, from its formation, affords but little resistance, and which is frequently left unsupported, must considerably augment the pitching motion, and contribute to the tendency to arch or hog.

In the aftermost section, the mizen-mast may be considered as contributing to the excess of weight; but it is not of such magnitude as the fore or main-mast; and its position is much more favourable for the ship than the fore-mast. The strain also on the after part is not so great as forward, as it is seldom left so entirely unsupported

by the passing of a sea, and the sending motion is not so sudden or violent as the pitching.

In the extreme sections, and from the formation of those parts below the surface of the water, the upper works may also be considered as contributing to the excess of weight.

In the middle section, the main-mast, from its magnitude, may be considered as materially contributing to the excess of weight; and that, according to the ordinary distribution of the weights in the main hold, a large proportion of it may be supposed to fall in the vicinity of the mast. If this conclusion be admitted, it must appear prejudicial, and the more so, in consequence of the pressure preponderating so much at both extremities of the section. Among other weights concentrated about the mast is the shot locker, and which must considerably add to the unavoidable and too great weight of the mast alone acting on so small a space.

I shall now endeavour to explain how far the alterations proposed in my former remarks would be likely to remedy the inequality of the distribution of the weight and pressure specified in the calculation.

In the foremost section, No. 5, where there is at present an excess of weight, are placed the bower anchors, and the gunners', boatswains', and carpenters' sea stores, which I proposed transferring; the anchors further aft, by removing the cat heads to the fore parts of the channels, which, although by the removal still situated in the same section, would considerably lessen the power of their weight on the ship in a sea; and the sea stores to the after cock-pit, which will be found situated in section No. 2, where the pressure now preponderates.

In the after section, No. 1, where there is also an excess of weight, the bread is stowed at the extremity; a part of which, together with beds, slops, marine clothing, &c., (at present stowed in the after cock-pit) I proposed should occupy the present place of the sea stores in section No. 5; which would reduce the excess of weight at present in the after extremity, and place less weight, more lively, and more speedily consumed than the sea stores, in the place now occupied by them.

Such arrangements would also be likely to contribute to a more equal distribution of the weights and pressure in sections 3 and 4; as it would most probably admit of weight being removed from the one where there is at present an excess, to that where pressure preponderates,—and, in fact, to a much more equal distribution throughout the whole body.

The following alterations would also contribute to a better distribution than the present.

Let the bower and sheet cables be stowed further aft; the stream cable and hawsers abaft them, in the space now occupied by cabins, slop-room, &c.; and the stores, at present stowed in the foremost section, No. 5, removed aft to the fore part of the cable tiers; a part of the bread, slops, beds, marine clothing, &c., as in the former proposal, to occupy the present place of the sea stores in section No. 5. By such arrangements the weight of the stream cable and hawsers,

and part of the bower cables, would be removed to section No. 2; the sea stores to No. 4; and the weights reduced at both extremities.

The excess of weight would not only be considerably reduced in the fore extremity, by the proposed alterations, but at sea, if desirable to lighten this part as speedily as possible, a regular decrease, in a 74 gun ship, of two tons per week, may be calculated on, till the expiration of half the cruise, when the fore bread room would be cleared.

By a minute inspection and measurement of the different parts, and a correct calculation of the different weights and their bulk, the distribution may be made with great exactness.

Removing the anchors where they will stow perfectly clear of the ports, and similar to the sheet and spare anchors, will also leave the round of the bow perfectly clear, and remove every impediment to its being better fortified. [*Quarterly Journal.*

Experiments and Observations on some of the Phænomena attending the sudden expansion of compressed elastic Fluids. By PETER EWART, *Esq.**

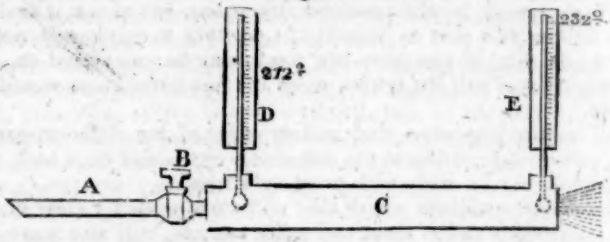
HAVING occasion, about seven years ago, to make some experiments on a high pressure steam engine of the estimated power of nine horses, in the boiler of which the elasticity of the steam was equal to sixty pounds (including the atmosphere) on the square inch, and, consequently, the interior temperature about 290° of Fahrenheit, I applied the bulb of a thermometer close to the opening of the safety-valve, while the steam issued from it in great quantity, and it stood steadily at 160°. The engine being in motion, and the steam, after having passed through the cylinder, escaping to the atmosphere by a perpendicular pipe four inches in diameter, and five feet in height, I applied a thermometer to the steam as it issued from the top of that pipe, and found the temperature to be 212°.

Finding the temperature of the issuing steam only 160° at the safety valve, close to the boiler, and 212° after it had passed to the distance of five feet from the boiler, I constructed an apparatus (fig. 1.) for the purpose of ascertaining whether, under certain circumstances, the temperature of the steam increases after it has issued from the boiler. I had an opportunity (in March 1823) of applying this apparatus to the high pressure steam boiler of Mr. Philip Taylor, at Bromley, near London. A is an iron pipe of three quarters of an inch bore, connected with the boiler, and terminated by a stop-cock B, the area of the opening of which was the same as that of the pipe. The end of a copper tube C, two inches diameter, and sixteen inches long, was screwed to the cock B, so as to be steam tight. To this tube was adapted a thermometer D, so that the bulb stood directly opposite the centre of the opening of the cock B, and at the distance of an inch and a half from it. The opening in the side of the copper

* This article consists of extracts from two papers read before the Literary and Philosophical Society of Manchester;—communicated by the author.

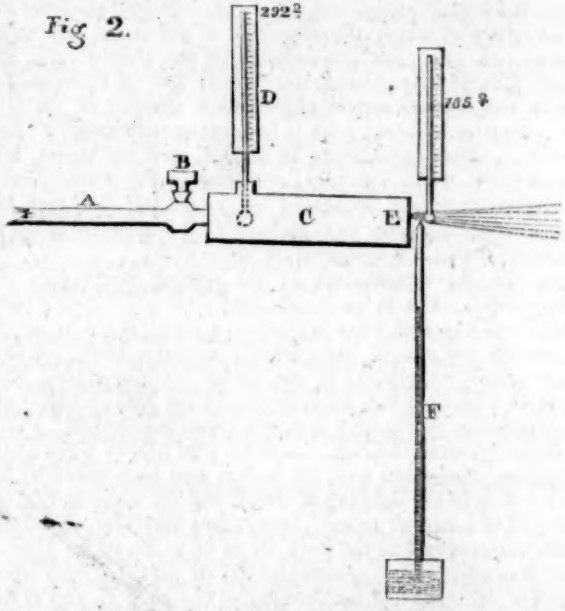
tube, through which the stem of the thermometer passed, was made steam tight. Another thermometer E was fixed in the same manner,

Fig. 1.



near the extreme end of the copper tube, which end was quite open to the atmosphere. The elasticity of the steam in the boiler being equal to fifty-eight pounds, including the atmosphere, on the square inch, (the internal temperature consequently about 285°) and the cock B fully open, the thermometer D stood at 212°; while E stood at 232°, showing an increase of 20° of temperature at that end of the copper pipe. The tube being removed, another copper tube C (fig. 2.) of the same diameter, and nine inches long, was screwed to the

Fig 2.

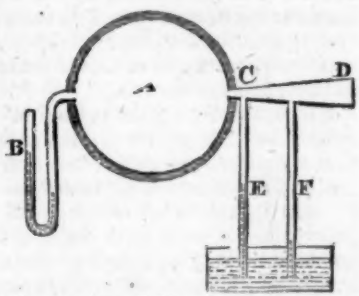


same cock B. This tube was furnished with a thermometer D as in the last experiment. The end E of the copper tube was stopped by a flat plate, excepting a hole $\frac{1}{12}$th of an inch diameter, in the centre

of the plate. The steam in the boiler being about the same force as in the last experiment, and the cock B being opened, the thermometer D stood at 292°; while another thermometer, having a very small bulb, held near the hole E, as the steam issued from it, stood at 185°. A small glass tube F, open at both ends and drawn to a fine point at the top, was placed so that the top of the tube was in the jet of steam issuing from E, while the lower end of it was immersed in a trough of mercury. The thermometer D standing at 292°, as before, the mercury rose twelve inches in the tube F. The mercury stood highest in F when it was near to E.

In August 1825, I had an opportunity of making some experiments on the sudden expansion of atmospheric air at Messrs. Fairburn and Lillie's foundry in this town, of which the following was one. A (fig. 3.) represents a transverse section of a cylindrical horizontal pipe, seven inches in diameter, which conducts air from a blowing apparatus to a furnace. B is an inverted glass syphon inserted into the side of a pipe A. A round hole, 4-10ths of an inch diameter, was made in the opposite side of the pipe, to which was adapted a conical tube of tinned iron CD, 5.4 inches long, and whose internal diameter was .4 inch at C, and 1.05 inch at the extreme end D, which was open to the atmosphere. To the lower side of this conical tube, two perpendicular glass tubes, E and F, were attached, their upper ends opening into CD, and their lower ends being immersed in a trough of mercury. The centre of the tube E was .5 inch from the inside of the pipe A, and the centre of F was 2.2 inches from the centre of E. Some mercury having been put into the inverted syphon, and the blowing apparatus being set to work, (the air passing through A at the velocity of forty-five feet per second,) the mercury stood at 1.8 inch higher in the outer than in the inner leg of the syphon; while the mercury in the trough rose 2.7 inches in the tube E, and only .4 inch in F; showing a greatly diminished pressure in the air at E, while its pressure was much increased in passing from E to F. On the internal pressure in A being increased, the mercury rose higher in nearly the same proportion in E and F.

Fig. 3.



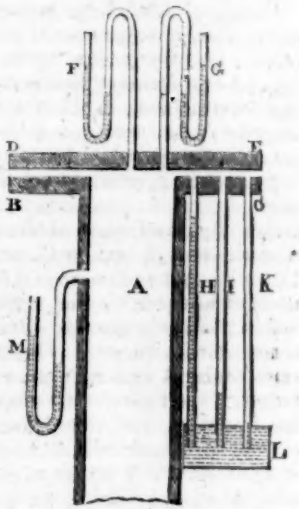
In the *Annales de Chimie et de Physique* for September 1827, there is an account of a fact observed in 1826 by Mr. Griffith, engineer, at Fourchambaut, which is described as consisting of this:—That if air strongly compressed in a reservoir escape by an orifice in a plane surface, and if a plate or disk of metal be presented to the jet of air, that plate is attracted to, instead of being repelled from, the flat surface from which the air issues.*

* This fact had been previously observed in October 1824, by Mr. Roberts, a member of the Manchester Philosophical Society.

In the same article in the *Annales de Chimie*, there is an account of some experiments and their results on the issuing of compressed steam.

Some of these results agreeing, and some being at variance, with those exhibited in figs. 2 and 3, I constructed the following apparatus for the purpose of examining more distinctly the effects produced by the expansion of compressed air under similar circumstances. A (fig. 4.) is a longitudinal section of a perpendicular pipe of four inches internal diameter, connected with a reservoir of compressed atmospheric air. BC is a cross section of a flat circular piece of wood 11.8 inches in diameter, having a circular orifice four inches diameter through its centre, and adapted to the upper end of A, so that this orifice shall coincide with the interior circumference of A. DE is the section of another flat circular piece of wood, of the same diameter as BC, and placed directly over it, and fixed so that it may be uniformly depressed or raised from BC by means of screws.

Fig. 4.



F is an inverted glass syphon inserted into the centre of DE, and G is a similar syphon inserted into DE, at the distance of 1.5 inch from F. H, I, and K are three small glass tubes, open at both ends, inserted into BC, and having their lower ends immersed in a trough L of coloured water. M an inverted syphon inserted into A. The centre of the tube H was at the distance of .9 inch; that of I, 2.1; and that of K, 3.4 inches from the interior side of A. The space between BC and DE being adjusted to .2' of an inch, some mercury being put into all the inverted syphons, and the compressing apparatus being set to work,—the syphons G and M indicated each an interior pressure of 1.25 inch, and the syphon F, 1.3 inch of mercury. The coloured water rose 9. inches in H, 2. inches in I, and .5 inch in K. On the interior pressure in A being increased, the coloured water rose higher, in nearly the same proportion, in H, I, and K; and the amount of the downward pressure on DE still much exceeded that of the upward pressure from A.

Some of these results being still at variance with some of those described in the article of the *Annales de Chimie*, already quoted, I prevailed on Mr. Dalton to witness a repetition of the experiments (fig. 4,) in November 1828, and he was satisfied that the results were correctly stated.

Various explanations have been proposed of some of the phænomena which I have described.

It has been supposed that the ascent of the mercury in figs. 2 and 3, and of the coloured water in fig. 4, is occasioned, not by the rarefaction of the fluid in contact with the upper ends of these tubes, but by the particles of fluid in the tubes (whether these particles be of air, water, or mercury) being drawn or sucked out by some kind of lateral action of the issuing fluid. But if there were any action of that kind, its effects would be apparent in the inverted syphon (fig. 3.); and the mercury in the leg next to A (in which the air was moving at the rate of forty-five feet per second) would have been elevated instead of being depressed.

I applied an inverted syphon to the air reservoir of a similar blowing apparatus, in which the interior pressure was equal to 33.5 inches of mercury (including the atmosphere,) while another syphon was applied to the conducting pipe, as in fig. 3, at the distance of twelve feet from the reservoir. The air was passing along the pipe with the velocity of forty-eight feet per second, and the interior pressure was only 1-268th part less in the conducting pipe than in the reservoir.

Explanations of the low temperature of high pressure steam, at the place were it issues, have indeed been proposed, without any reference to the rarefaction of the steam at that place. It has been held by some, that the steam issues with so great a velocity at that place, that it has not time to give out its heat; that unless part of the steam be condensed into water, little or none of its heat can be given out; and it has been asserted that when the hand is presented to such steam, it remains dry. Others have held, that the current of steam carries with it a current of air, attracted in some manner to its sides, by which the bulb of the thermometer is cooled.—My hand, however, has always been wet by the steam when presented to it; and in most of the experiments which I have made, the bulb of the thermometer was surrounded with steam; so that it could not be affected by any external air supposed to adhere to the sides of the current of steam.

That the temperature of high pressure steam, on being released, should come down to the temperature of steam of atmospheric pressure, is what might be expected. But how it instantly falls so much below 212° requires some explanation.

There are three circumstances to be observed in the foregoing experiments, which appear to require particular attention.

1st, The reduced pressure takes place in the greatest degree near the point where the air or the steam is released from compression. (See figs. 2, 3, and 4.)

2ndly, After the air has been suddenly expanded, it quickly recovers a large portion of its former density. (See figs. 3 and 4.)

3dly, A portion of elastic fluid of given density is displaced by another portion of the same fluid, of much less density than that of the fluid which has been displaced. (See figs. 3 and 4.)

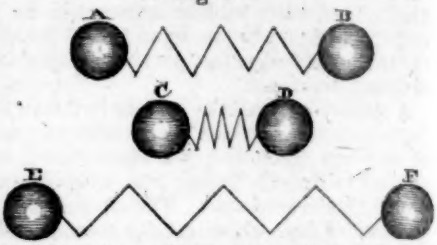
In October 1822 I read a paper before this Society, giving an account of some experiments which I had then made on this subject, and suggesting an explanation of the results on mechanical principles. I did not offer it then nor do I offer it now, with the expectation that it will be generally considered as satisfactory. All the experiments, however, which I have made since that time, admit, as it appears to

me, of that explanation: and I have had the satisfaction to find that it has been adopted by several very good experimenters.

Such as it is, I beg leave to offer it again after an interval of six years, to the consideration of this Society.

If we suppose A and B (fig. 5.) to be two equal balls of lead attached to the opposite ends of an elastic spring; and if we suppose the spring, in the position of A and B, to be in a neutral state, that is, to have no tendency either to expand or collapse.

Fig. 5.



If we next suppose the balls to be compressed together as at C and D, and then suddenly set at liberty, they will, by the joint action of elasticity and momentum, spring out, not only to the distance they were at originally as at A and B, but to a distance as at E and F, as much beyond their original distance as they had been compressed within it. After having been separated to that distance, they will collapse and vibrate to and fro for a time.

Now if elastic fluids such as air and steam, consist of separate particles, we know that these particles are kept asunder by an elastic force, the same in effect as if steel springs were interposed between them; and we cannot doubt that such particles have momentum like all other ponderable matter; neither can I see any reason to doubt that the sudden expansion and contradiction of their distances must be similar to those of the leaden balls.

Thus, if we suppose A and B to be two particles of atmospheric air, at the distance they are in the atmosphere; if they be compressed as at C and D, and suddenly released, they will be separated as at E and F, and produce all the effects of a corresponding rarefaction or dilatation. It is true they may not separate so far as at E and F, because of the interruption they meet with from other particles of air in the atmosphere; but it is reasonable to conclude that they will separate beyond the distance of A and B. After being separated to their greatest distance, they will collapse, not by the reaction of the elastic force between them, as in the case of the leaden balls, but the similar action of the elastic force of the particles of air into which they are projected.

In this view of the phænomena, by the combined mechanical action of elasticity and momentum, the low pressure of highly compressed steam, at the place were it is released, becomes only what is due to its mechanical dilatation,—the consequence of its previous compression. And, accordingly, it is found that the more it is compressed, the more dilated and the colder it is when suddenly released.

[*Philosophical Magazine.*

On Substituting Plates of Fusible Metal, for Wood-Blocks, in Calico Printing, &c. *By* M. G. Engelmann.*

The engraving of wood blocks for calico printing is very expensive, and these blocks being also formed of an hygrometric substance, are continually subject to change, from swelling and shrinking by the effects of moisture and dryness, and thus occasion a considerable loss of time, and give false impressions, from the trouble of replacing them, and the consequent inequality in their adjustments. I have therefore endeavoured to substitute for them, a substance which is not liable to swell by the action of humidity, can be moulded with great accuracy, and at the same time is capable of resisting the effects of the blows of the mallet, and of the acids contained in certain of the colours used in calico printing. The fusible alloy appears to me to offer these advantages, and I employ the *en cliché* process, in its application.

I operate in the following manner;—having made an engraving in wood, on a piece of plank, and given a sufficient breadth to the bottom of the lines, to enable the cast to part from the mould, I interpose between the metal and the wood a substance, which shall facilitate their separation; to effect this I brush over the engraving a mixture of ground *sanguine* (red-chalk,) and water. I then finally affix the engraved block to the bottom of the upright slide or stem of the stamp, and let it fall suddenly upon the melted fusible alloy, at the moment when it is just upon the point of becoming solid, or has acquired a *pasty* consistence; I thus obtain a counter proof of the engraving. This counter proof serves as the matrix or mould for the engraved plates of fusible metal which I intend to make. For this purpose, I affix it upon a piece of wood, and surround it with a border of metal, intended to determine the thickness of the metal plates struck in it; and which border is also formed in such a manner, as that whether placed on one side or the other, it shall exactly fit; I then firmly affix this matrix, thus surrounded with its frame, upon the bottom of the stem of the stamp, and strike another counter proof *en cliche;* and so proceed, until I have thus produced enough of them to compose and to cover a calico printing block.

These second counter proofs, thus obtained, I place, with their engraved faces undermost, the one by the side of the other, upon a flat surface; and also shape and dispose them with the necessary regularity, to ensure precision in the impressions from them. I then pass a heated iron along the joints, in order to solder one piece to another; and then fix the whole upon a wooden plank, by means of copper nails; but I previously varnish the plank, to prevent moisture from penetrating it. These blocks, if I may judge from the two experiments which I have made with them, offer no other inconvenience than being a little heavier than those made entirely with wood:

* From *Bullet. de la Soc. Indust. de Muhlhausen;* and Ferussac's *Bulletin des Sciences Technologiques.*

they differ however but little from those blocks in which the raised parts are made with brass or copper; a difference, trifling, in comparison with the great advantages they possess, in not being liable to change from the action of moisture.

It is easy to see, that a calico printing block, thus constructed, must cost much less than one engraved upon wood; and especially, as we need only to engrave a segment, or one of the parts, which are usually repeated a great number of times; and to multiply them by the *clichage*, an operation which will produce in less than an hour, more casts than are sufficient to fill a block, thickly covered with them. The value of the metal employed, and which need not be more than a line in thickness, is a mere trifle; and, after the block has done its work, may be remelted. We can preserve the small matrices, which occupy but little room, and when we require to make another block, it can be done quickly. It is also equally easy, in changing a moulded pattern, to vary the position of these small casts; since we can either bring them near together, or remove them to a distance apart; place them in a line, or mingle one piece with another; and thus either form them into borders, or employ them in the interior parts of the prints.

If we compare the price of these blocks, with those whose raised parts are formed of brass or copper, it is greatly in their favour; and we have no doubt that in the hands of skilful persons, the art of forming them by means of *clichage*, will obtain as great perfection as those blocks possess.

On Improvements in the Manufacture of Horn and Tortoise shell Combs. *By* Thomas Gill, Esq.

The author has long known, that *two large toothed* tortoise shell combs could be made out of one piece of tortoise shell; the interstices in the one, furnishing the material to form the teeth in the other, and *vice versa;* but he had no idea of the possibility of cutting two combs with fine teeth out of one piece; this is, however, now effected in the following manner:—The thin plate of tortoise shell being softened by heat, a fine and properly shaped chisel is passed through it, in such a manner, as to divide it into the teeth, and the spaces between them, but without removing or cutting away any of the substance of the tortoise shell; and thus the two combs can be formed, with great economy, out of this very expensive material.

Another great saving, in the same costly material, has likewise been effected by a German comb maker, settled in this country; who forms the solid broad part of the large toothed combs, now so generally worn by the ladies, out of tortoise shell; but their teeth are made in a plate of horn, *soldered* by means of heat to the tortoise shell; and that in so dexterous a manner, that although the place of the joining was pointed out to the editor, yet he was unable to distinguish any difference there, between that and the other parts of the comb. The veined or clouded appearance of tortoise shell was given

to the horn, in the usual manner, by means of oxide of lead and quicklime, or orpiment; and so ably was this managed, that it greatly contributed to prevent the juncture of the horn and tortoise shell from being perceived.

Our English comb makers also tinge or dye their horn combs in the above manner; but they very soon assume a dull appearance, owing to the lead in the dye becoming revived, and putting on its metallic appearance. Now the dyed combs, made by the German, have a most beautiful polish, which continues for a length of time unimpaired; so that it would seem that they had been coated or defended by a varnish. It is by no means improbable, that the French, or rather German polish, or varnish, composed of shell lac spirit varnish, applied by the aid of oil, has been used to defend the combs, and give them the beautiful polish above mentioned.

[*Tech. Rep.*

Remarks by the Editor.—The machines for cutting tortoise shell combs without waste of material have been made and used for several years in the United States. We believe that they were invented in Germany, but they have been much improved here. They are equally applicable to combs of all sizes. They not only save material, but time, and make better work. Our workmen solder the teeth into tortoise shell combs, perfectly, but we believe they have not combined the shell with horn. The beautiful polish of which Mr. Gill speaks is given upon the substance of the material, without the aid of varnish.

On Church Bells; their substance, weight, and form; mode of fixing and striking, &c. &c.

Fourteen centuries have now elapsed since the invention of bells, but it is not, comparatively, till of late years, that the attention of scientific men has been directed to the investigation of their proper form and composition.

The object which the ancients evidently had in view, was to collect the greatest possible mass of metal into their bells—the heaviest being most esteemed. The extent to which their labours were carried may be illustrated by the following list of a few of the largest bells, commencing with

	lbs.
That at Moscow, cast by order of Anne, empress of Russia, which weighed	432,000
Seven bells at Pekin, China, each of which, according to Father le Compte, weighed	120,000
St. Peter's (re-cast in 1785)	18,667
The Mighty Tom of Oxford	17,000
The Great Tom of Exeter	12,500
The do. do. of Lincoln	9,874
The Tom Growler (St. Paul's) London	9,520

Besides which, there are several others of immense weight, both in this and foreign countries.

The miraculous powers ascribed to bells, in the dark ages of monkish superstition, have been long since exploded. Perhaps the most ridiculous of all the extravagant practices of those times was "the Passion Bell," so called from being appropriated to the service of passion week. "To give this bell a tone appropriate to the sombre character of the season, it has been cast with several large holes round the top—a contrivance which, without diminishing the vibration of the metal, prevents the distinct formation of any musical note, and converts the sound into a dismal clangour."* During the continuance of practices like this, little improvement could be expected in the construction of bells.

Bell-founders of the present day have, however, begun to perceive the immense waste of metal hitherto incurred, and are convinced that a better sound may be obtained with, at most, one-half the weight of metal formerly used.

This appears to be the opinion of your talented correspondent, Mr. Harrison, who, in his interesting communication, says, "my researches have not only been directed to those proportions which will afford the greatest and most flowing sounds and deepest notes with a minimum weight of metal, but they have also been directed to effect a perfect concurrence of all the parts, so that the sweetest tones may at the same time be produced. Moreover, these proportions have also the effect of improving the shape considerably, it being allowed to have a very symmetrical and handsome appearance, so that it perhaps may not improperly be styled the perfection of the bell form." This is a somewhat fanciful idea, and will not apply to some improved bells that I have seen, which possessed the most rich and mellow tones, but certainly none of "*the perfection of the bell form.*"

With the greatest respect for the abilities of Mr. Harrison, and our other enlightened bell-founders of the present day, permit me to observe, that notwithstanding the great antiquity of bell-founding, I am of opinion that the art, in regard to improvement, is yet in its very infancy; and that no investigations hitherto made have furnished data sufficient to *establish* the form best calculated to give a maximum effect with a minimum weight of metal, in the construction of large bells.

Let any one, for a moment, consider the vast difference in form which exists between musical clock bells and those of a larger description. A comparison, of effect, in proportion to the weight of metal, is very much in favour of the former, but I have some notion that *perfection* lies in a form somewhere between the two. M. Reaumur, in a paper in the "Memoirs of the Paris Academy," on the shape most proper for bells to give them the loudest and clearest sound, observes, that "lead, a metal which in its common state is not at all sonorous, becomes greatly so on its being cast into a particular form, and that very different from the common shape of bells."

* Hone's "Every Day Book," vol. ii. p. 392.

This form, M. Reaumur afterwards observes, is the segment of a sphere, which shape is now given to the best musical bells, varying, however, in being more or less oblate; and he continues, "now, if this shape alone can give sound to a metal which in other forms is perfectly mute, how much more must it necessarily give it to other metals naturally sonorous in whatever form." M. Reaumur very judiciously observes, that had our forefathers possessed opportunities of being acquainted with the sound of metals in this shape, we should probably have had all our bells at present of this form. Mr. Drury, whose inimitable musical bells are so well known, has of late extended his researches to bells of a larger description, some of which he has cast and fixed; and he goes so far as to say, that he will produce a bell of any required note with ONE-FOURTH of the metal formerly used, and at the same time obtain a far more harmonious tone.

Another practice, which to me appears highly absurd, is the present mode of bell-*ringing*—where the whole mass of metal in the bell is put into motion to obtain that sound, which may be better elicited by moving the clapper only: for I am thoroughly convinced that a much finer tone may be drawn from every bell well struck by a hammer, than by any swing that can be given to a clapper in the interior of the bell.

We frequently read of bells that require *twenty-four* and *thirty-two* men each to ring them—whereas, one man with a suitable hammer, might have produced an equal, or even a superior sound. The bell at St. Paul's Cathedral is by some said to weigh 11,474 lbs. and its clapper 180 lbs. To make this large mass revolve, as it were, round the smaller, is as though the earth were to revolve round the moon, or the sun round the planets—while the reverse is well known to occur in the harmonious arrangements of nature. In addition to the immense waste of human labour, which takes place in our present mode of bell-ringing, there is another objection to this practice, from the liability to accident, and from the injury done to steeples, the stability of which, sooner or later, becomes destroyed.* Where the soundness of any steeple is questionable, it is necessary to put an immediate stop to the practice; and though not generally known, it is nevertheless a fact, that nearly one-half of the peals of bells in this country cannot, at the present time, be rung with safety. This is the case at Bow Church, the weight of whose bells is as follows:

	cwt.	qrs.	lbs.
First, - - - - - - - -	8	3	7
Second, - - - - - - - -	9	2	0

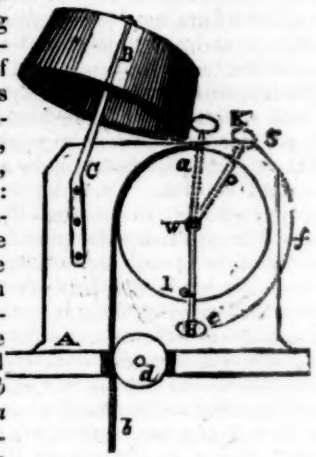
* On Monday afternoon, Nov. 9th last, while the grand peal of ten bells in the tower of St. Sepulchre's Church, Snow-hill, were ringing a merry peal (Whittington's) as the lord mayor's procession was passing, the tenor, or great bell, weighing 3300 lbs. broke asunder at the crown, and fell with a most tremendous crash into the pit beneath, to the great alarm of the ringers, who were three floors under, and were shook as if by an earthquake. They were, however, saved from destruction, by the strong oaken timbers of the floor, which received the bell, and arrested its farther progress.

	cwt.	qrs.	lbs.
Third,	10	1	4
Fourth,	12	0	7
Fifth,	12	0	24
Sixth,	17	0	11
Seventh,	20	2	26
Eighth,	24	2	25
Ninth,	34	2	6
Tenth,	53	0	2

In all about 10 tons, which swinging to and fro in such a place as the upper part of a high steeple, is sufficient to shake even those of the firmest construction. I should estimate the clappers of all the above to weigh about 400 lbs., which is all that need be put in motion to obtain the full effect from the bells.

When it becomes unsafe to *ring* the bells, they are what is technically called "clappered:" in this case the clapper only is put in motion, but under such unfavourable circumstances, that no wonder the sound thus produced is inferior to that obtained by ringing.

The sketch given exhibits an improved mode of fixing and striking bells, invented by Mr. Drury.—Upon a stand or upright piece of strong timber, A, the bell, B, is supported by an iron arm, C, incapable of motion: upon an axle, securely fastened to the stand, A, revolves a small grooved wheel, W: upon the same axle, also, freely revolves a rod or lever carrying the hammer, H. At *a*, one point of the wheel is attached the rope *a*, *b*: on the face of the wheel there is a projecting stud, I, against which the clapper arm rests. When the bell is required to be rung the rope *b* is pulled, which brings the point *a* of the wheel into the lowest position, and at the same time raises the hammer into the position K, by means of the stud I, upon which it rests; describing the arc *e*, *f*, *g*.



In passing over this distance, however, the hammer will have acquired such a momentum, that it will not stop with the wheel, but, leaving it, will strike the bell with such force, as to draw forth its full tone with the finest effect. The blow having been struck, the hammer falls back, partly from reaction and partly from its own gravity, upon the stud, I, and carries the wheel round into its original position, when another blow may be struck, and so on, *ad infinitum*. The parallelism of the rope is maintained by a small grooved wheel, *d*.

With this mode of fixing and striking, the full tone of the bell is obtained with the greatest ease, and with unexampled rapidity. M. Perrault considers bells as composed of an infinite number of rings, which, according to their different dimensions, have different tones, as chords of different lengths have; and, when struck, the vibrations of the parts immediately struck determine the tone; being supported by a sufficient number of consonant tones in the other parts. I should therefore suppose the fewer the number of these rings—and the smaller their difference in length, and consequently in tone, the more uniform and harmonious will be the sound produced. The form of bell adopted by Mr. Drury, as sketched above, coincides in every respect with this position: the high notes produced by the smaller rings of bells of the usual form, which are antagonizing ones, are in the new form wholly got rid of; and this may, in some measure, account for the depth of tone which these bells possess.

Before dismissing this subject, I may observe, that the just proportions of *weight* and *velocity* for the hammers of clock bells, furnish an interesting and ample field for speculative research. The existence of these proportions is by some denied: that they do exist, however, may be satisfactorily established, by considering the two extremes of the case. Thus, for instance, let us take the great bell at St. Paul's Cathedral; and, in the first instance, suppose that an iron musket ball, weighing one ounce, is fired direct against it: in this case we have a hammer of *small weight* moving with prodigious *velocity*. Secondly, let us suppose a weight of nine or ten tons moving very slowly, say through the space of two or three inches per second, or at such a rate that its numerical momentum shall be the same as that of the musket ball in the first instance: in this case we have *great weight* with a very small velocity; and it is pretty clear, that in neither case will any thing like the full tone of the bell be brought out: it remains therefore to ascertain that proportion, in which the weight and velocity of the hammer shall be such, as to produce the full effect of the bell. Inattention to this circumstance is, in many cases, the reason why such an imperfect sound is elicited from bells when struck by the clock hammer, and is an error into which the best workmen have sometimes fallen.

Europeans generally use iron, the Chinese, wood, for the construction of bell hammers. The iron is unquestionably the best of the two; but I am of opinion, that some substance, perhaps an alloy, may yet be discovered far more appropriate than either one or the other.

Wm. Baddeley, Jr.

[*Mechanics' Magazine.*

Important Experiments on the Friction of the Wheels of Carriages.

A number of experiments were made lately on the Liverpool and Manchester Rail-way, under the directions of Mr. Hartley and Mr.

Rastrick, engineers, with a view of determining, 1st, what are the comparative merits of various patent wheels and axles for rail-way wagons; and, 2nd, what is the actual degree of friction of each; or, in other words, what proportion the force requisite to move or propel such wagons upon a rail-way bears to their load.

As the report of the engineers has not been yet made public, we cannot inform our readers which of the different patent wheels has been found to answer best, but we learn with great satisfaction that the following results have been deduced from the experiments:—

1. That a reduction of the proportion of the bearing of the axles of rail-way wagons to the circumference of the wheels, causes a proportionate reduction in the friction.

2. That with loaded wagons, the bearing part of the axles of which is only 1½ inch diameter, the diameter of the wheels being 3 feet, or thereabouts, the friction is less than 6 lbs. to the ton, that is, only 1 in 400.

3. That though friction rollers at the axles of wagons are in some respects advantageous, the great modern improvement consists in reducing the diameter of the axles.

As the wagons used on this occasion were the same which were employed at the Rail-way Competition, in October last, it follows that the power of the competing engines was then underrated *one-half*, inasmuch as the friction at the time was computed at 12 lbs. to the ton, or rather less than 1 in 200. But the most important deduction we are disposed to draw from these experiments is, that steam carriages can never be expected to run successfully *except on rail-roads*. The resistance to the rubbing surface of the wheels on a rail-way is as nothing, and the friction only 1 in 400: and admitting the power of an engine to carry a load up an ascent of 1 in 30 to be only one-eighth part of its power on a level, still the force of the engine working on a rail-way must be ever pre-eminently superior to one working on our common roads, on the very best of which the resistance and friction together are as much as 1 in 20 in summer time, and 1 in 10, or 1 in 12, and never less than 1 in 15, during the winter half of the year. For heavy goods, at a slow rate of travelling, and on comparatively level roads, steam drags may be used as substitutes for wagons and vans; but the rapid pace now required by modern impatience can only be expected to be attained along rail-ways, which, to obviate danger, should be as completely isolated, by fencing and bridging, as canals now are. [*Ib.*

On the manufacturing of Perfumed Imitative Wax Candles. Patented by M. Lorraine, *of Paris.*

Candles made of tallow only, are unctuous, opaque, greasy, little sonorous, especially in summer, liable to run or gutter, and readily acquiring a rancid smell. These inconveniences are avoided, by putting fat, which has been melted and run into cakes, to ferment in a

stove where the heat is moderate: this fat distils, and throws off an oily liquor, which is removed with a piece of linen, or a sponge.

To free the grease from the fleshy and fibrous parts by which it is accompanied, it is first chopped, and after being washed in several waters, it is boiled with a given quantity of Roman alum. The alum soon separates, and destroys the heterogeneous parts, and we obtain a pure clear fat, which will last a very long time. The fat chopped and melted is run into buckets full of water distilled from aromatic simples, such as lavender, thyme, rosemary, &c. The fat and water are beaten together with a spatula, to effect a union. After forty-eight hours, the fat is separated from the water by means of a water bath. The water alone is disengaged, and the aromatic and odoriferous parts remain incorporated with the fat. To complete the purification, the fat is liquified and scummed, till no foreign substance nor water remains. This will be known by the limpid state of the fat, which then yields only a pure white scum. Still greater purity is obtained by a second quantity of alum incorporated with the tallow.

Before casting or running the candles, a composition is made, of half wax and half spermaceti, which serves to prepare the wicks. This composition, harder and more cohesive than the tallow, makes the candles less subject to gutter, makes them firmer, last longer, and require less snuffing. At the moment of removing the pure liquified tallow from the fire to cast the candles, a certain quantity of gum arabic dissolved in water, and united with a small quantity of wax and alum, is incorporated with it. The whole are beaten together, and when the tallow has settled well, and cooled to a certain temperature, it is poured into the moulds. By this preparation, in proportion as the cooling takes place, the foreign substances proceed to, and fix at the surface of the candles, forming a kind of covering, pleasant to the touch, like wax candles. This covering also prevents the candles from guttering, and enables a person to handle, and even rub them, without greasing the fingers, and without communicating any other smell than that of the aromatics entering into the composition.

The last operation for preventing the guttering of the candles when burning, and giving more solidity to them, is to prepare some glovers' size, very weak, and boiled with another quantity of gum and alum, and to pass a hair pencil, dipped in this size, all over the candles, and the next day after they may be used.

Candles prepared in this way are clear, transparent, sonorous, and last longer than others. They feel like bougies, and have the colour of pure wax.

[*Description des Brevets.*

MODERN ANTIQUES, No. 2. *By the Editor.*

Description of a Truck on a new construction, invented by M. D'HERMAND, *showing a method for diminishing friction in machines.*

THE foregoing is the title of an article in vol. 3 of *Machines Approuvées par L'Academie Royale*, dated 1713. We have given a cut

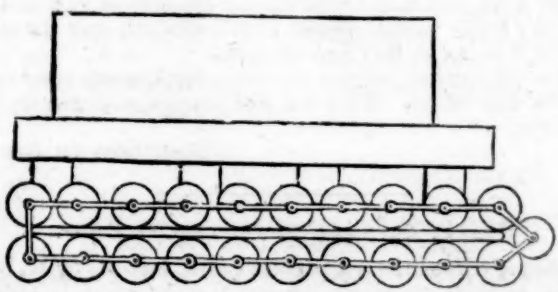
of the machine as described in the above work; there, however, the different parts are represented in detail, which we have omitted as not necessary to our purpose.

More than one modern Dedalus has reinvented this truck or car of M. D'Hermand, as the files and shelves of the patent office will prove; and various ingenious contrivances have been made, to change the rubbing friction of carriage wheels for the rolling friction. Garnet's friction rollers have been repeatedly applied for this purpose. Rollers are familiar as used under heavy boxes, and other weighty articles; these, however, soon run out behind the load, and have to be re-applied in front. M. D'Hermand speaking upon this subject, says, "In using rollers as they are ordinarily placed under a load to facilitate its removal, it is extremely difficult to keep the rollers parallel to each other, whatever care may be taken for this purpose. In order to remove this difficulty, the rollers are each furnished with pivots, or gudgeons, in their centres, and connected to each other by straps in the manner shown in the figure, by which means their parallelism is perfectly preserved."

"The carriage is composed of two frames on platforms parallel to each other, and united together by standards mortised into the edges of each. Upon the upper platform the load is to be placed, whilst the endless train of rollers have room to pass between this and the lower platform. The rollers turn easily upon their pivots, and as the load is drawn forward, they circulate freely round the lower platform."

"It is manifest that from the number of rollers which sustain the load, each one supports but a small portion of it. They add but little to the weight themselves, from the manner in which they act, and the roller which is passing up at one end has its weight counterbalanced by that which is descending at the opposite end."

"It is requisite that the ground upon which this truck, or car, is used should be perfectly level and very solid, in order that the rollers may act equally in every part," &c.



We are aware that some of our patentees will be sadly disappointed at finding themselves anticipated by this obtrusive Frenchman, who certainly had no good reason for inventing such a car be-

fore others had invented the rail-road. We have but one consoling opinion to offer upon this subject, and that is, we do not believe that the invention will be found to be of any practical utility, even upon rail-roads of any description; the joints are too numerous, and the whole structure would be too complex as applied to a carriage of any kind, excepting one of the diminutive size proper to be placed on a shelf in one of the cases of the patent office.

The cut is without letters of reference, as the description given will fully explain the intention of the different parts.

An account of an extraordinary adhesion of the Safety Valve of the boiler on board the Steam Boat Legislator, on the Hudson. By the ENGINEER.

TO THE EDITOR OF THE JOURNAL OF THE FRANKLIN INSTITUTE.

SIR,—The late awful explosion of the steam boat Helen M'Gregor, has brought to my recollection an accident that occurred last summer under my own eye. Believing it may serve the cause of humanity, I think it my duty to make public the fact: it is this.

Last summer I was engineer on board the steam boat Legislator, belonging to Hudson; standing on the forward deck, I noticed that the engine was working faster than common, and not seeing any steam flow as usual from the safety valve, I started for the fire room, where I met the fireman then on duty; he told me that he had on 21 inches of steam, and that the rod in the steam gauge was up against the boiler deck. As the safety valve was loaded to carry only 16 inches, I became alarmed, and went to the fire-room and took hold of a cord that ran over a pulley and was attached to the lever of the safety valve, and attempted to raise the valve, but could not; I was still more alarmed, and went on the top of the boiler, where the safety valve was, and found all right there, that is, there was no extra weight on the valve; I then slided the weight in to the length of the lever up to the fulcrum, where the weight was merely nominal; still the valve did not rise; I became confounded; I took hold of the lever and lifted on it pretty stoutly, and continued lifting for some seconds, when all of a sudden, with an explosion like that of the report of a small field piece, the valve opened, and the steam rushed out violently; it continued to do so for some length of time before the steam got down to the usual pressure, the engine being at work all the time. There was no water on the valve, nor any visible obstruction to its rising of its own accord after the steam got beyond the pressure of 16 inches, which it had invariably done before. Now, sir, must not this obstruction to the valve rising have been caused by an adhesion that took place between the valve and the valve seat, both of the same metal—I think it certainly must have been caused by this adhesion of the metal only. I have had an experience of 12 years as an engineer, and never knew the like occurrence before. For many reasons I have not placed full reliance in the mercurial steam

gauge, but have always had entire confidence in the correctness and safety of the safety valve; but in this case I was deceived, and perhaps in a few moments more an explosion might have taken place, for I have no doubt that if the small rod in the steam gauge had had a free passage through the boiler deck, it would have denoted 30 instead of 16 inches.

It is usual on board steam boats to have the steam gauge so graduated as to show as many inches of steam as the engine will take, and to have the safety valve loaded so as to agree with the steam gauge, believing that when the steam gauge indicated 16 inches of steam, all the surplus steam would escape through the safety valve; engineers, or many of them, are in the habit of not blowing off any steam when the boat stops to make a landing, but depend wholly on the safety valve rising of itself after the steam has risen a little above its required height. This has been considered a safe way of proceeding, but the case stated above shows, most conclusively, that it is wrong to depend too much on the safety valve. I would recommend, by all means, that when a boat stops to land passengers, that the safety valve be raised, let the gauge indicate what pressure it may; this, sir, is the only safe way. Might not the engineer of the Helen M'Gregor have placed an implicit confidence in his safety valve rising when the steam had got to its required height, and is it not possible that an adhesion had taken place between the valve and the seat? and perhaps at the same time he was waiting for the valve to rise, he had double the required quantity of steam, which caused the awful explosion; such may have been the fact. Before the occurrence of my safety valve not rising when it ought, I had believed the cause of boilers exploding was, almost invariably, the want of a sufficient quantity of water. I now think some explosions may be attributed to the being deceived by the safety valve not rising as was expected by the engineer. If you think the above stated facts are worth a place in your valuable Journal, you are at liberty to insert them. You will please to word and arrange this account to suit yourself. I know nothing about making out a statement for a public print, but you may rely on the correctness of the fact above narrated; it can be testified to by the pilot, the clerk, and the fireman of the boat.

Your obedient servant,

JOHN B. CALHOUN, *Engineer.*

New York, April 12, 1830.

Remarks by the Editor.—We insert the preceding communication in the form in which it was received, and shall always be much gratified by the correspondence of observing practical men upon subjects with which they are conversant. The simple, unpretending style in which the foregoing facts are narrated, could not be improved by any effort of ours.

We differ from Mr. Calhoun in his estimate of the value of the mercurial steam gauge, and think that the case stated must convince him of its utility. In order to judge of the cause of the adhesion, the

exact form of the valve, and other circumstances relating to it, ought to be known. So far as the account goes, it appears that there was, in the present case, an actual adhesion of the valve to its seat, which, although not unfrequent to a certain extent, existed with a degree of force which was extraordinary. Our scientific readers are acquainted with that kind of adhesion which was first brought into general notice by M. Clement, of France, and which has since given rise to much discussion; there is nothing, however, to lead to the conclusion that the present case was in any way related to it, as an emission of steam would then have accompanied the adhesion. Our wish is to excite discussion rather than to offer opinions; we shall, therefore, leave the question, at present, to our correspondents.

On the alloy of Zinc and Tin. *By* M. Koeschlin.

This alloy is nearly equal to brass in tenacity, and resists friction as well. It is cheaper, since the mean price of the metals composing it is only eighty per cent. the cast off brass, and the pieces may be used as delivered from the moulds.

It is essential that the zinc employed be very pure; for on the purity depends the tenacity and fusibility of its alloy, which, if made with impure zinc, would readily break, would wear away rapidly, and would not run well in casting. The following are the different alloys proposed by the author:—

1 part of tin 3 parts of zinc	fusible from	260° to 300° (=500° to 572° F.)
2 do. tin 4 do. zinc	do.	300° to 350° (=572° to 662° F.)
3 do. tin 2 do. zinc	do.	320° to 360° (=608° to 680° F.)
Equal parts of tin and pure zinc.	do.	250° to 350° (=482° to 662° F.)
Ditto of tin and impure zinc.	do.	450° to 500° (=842° to 932° F.)

[*Buln. de la Soc. Industr. de Mulhausen.*

Meteorological Influence of Terrestrial Electricity.

This subject has been treated of by M. Carlo Matteuci, of Bologna, who endeavours to found certain explanations of natural phenomena upon the supposed accumulation of electricity upon the surface of the earth. He considers that there is an accumulation of this power upon particular localities, the electricity itself being developed by evaporation, or other circumstances, upon the surface, or by internal

chemical action; and when developed, being retained in particular situations by the non-conducting power of the neighbouring earth. This non-conducting power is supposed to depend either upon the particular nature of the ground, or upon its becoming dry by evaporation, and, therefore, it is said, it is rather upon elevated and isolated places than upon plains, above rocks than over forests, in summer than in winter, and in the middle of the day than during the night, that those stormy clouds are formed which frequently can only be explained by terrestrial electricity.

One explication furnished by this theory, is considered as ingenious; it applies to those luminous appearances which so frequently occur in the atmosphere during the evenings and nights of summer, and are called heat-lightning. These are attributed to electricity produced and accumulated as already mentioned. After sunset, the vapours which condense, form a conducting stratum near the surface, which serves gradually to re-establish the electric equilibrium between the earth and the atmosphere. It is especially in plains, that these flashes are observed, because the electricity accumulated on high and isolated places escapes rapidly in consequence of their form, lower temperature, and the greater rarity of the atmosphere about them.

Sometimes these discharges are supposed to be very powerful; and when the earth and air are very dry, are thought capable of producing earthquakes such as occur after dry seasons; and a very ancient method of avoiding such earthquakes is quoted and approved of, namely, the introduction of long bars of iron into the ground to considerable depths. These, it is supposed, serve to conduct off the accumulated electricity. The *Bibliothéque Universelle* very properly remarks, that it is desirable that this accumulation of electricity upon the surface in the manner described, and upon which the whole hypothesis rests, should be proved in a decisive manner.

[*Bib. Univ.* xlii. 8.

Preservation of Blood.

Sugar refiners and others are often inconvenienced by the difficulty of obtaining blood at the time when it is required for use. M. Toursel has endeavoured, in part, to remove this difficulty, by proposing a method of preserving this agent for some time without injury. It consists in putting the blood into bottles, or other vessels, with very narrow mouths, and being careful to fill them up to the neck; a layer of oil, to the depth of at least half an inch, is then put upon it to cut off communication with the atmosphere, and the whole is left to itself. M. Toursel states that he has, in this manner, preserved blood, with all its physical and chemical qualities, from the 1st of December, 1827, to January, 1829.

[*Journ. de Commerce.*

LIST OF ENGLISH PATENTS

Which have passed the Great Seal, from July 2nd, to September 23d, 1830.

To Elijah Galloway, for improvements in steam engines, and in machinery for propelling vessels, which improvements are applicable to other purposes—July 2nd.

To Jacob Perkins, for improvements in machinery for propelling steam vessels—July 2nd.

To Thomas Kilby, and Hugh Ford Bacon, for a new or improved gas lamp or burner—July 2nd.

To Robert Crabtree, for a machine or apparatus for propelling carriages, vessels, and locomotive bodies—July 4th.

To William North, for an improved method of constructing and forming ceilings and partitions for dwelling houses, warehouses, workshops, or other buildings, in order to render the same more secure against fire—July 4th.

To Margaret Knowles, for an improvement in axle trees for, and mode of applying the same to carriages—July 4th.

To George King Sculthorpe, for improvements on axles or axletrees, and coach and other springs—July 4th.

To Joseph Clisild Daniell, for improvements in machinery applicable to dressing woollen cloth—July 8th.

To William Leeson, for improvements or additions to harness and saddlery, part or parts of which improvements or additions, are applicable to other purposes—July 8th.

To Thomas Salmon, for an improved malt kiln—July 8th.

To William Ramsbottom, for improvements in power looms for weaving cloth—July 8th.

To Moses Poole, for improvements in the apparatus for raising or generating steam and currents of air, and for the application thereof to locomotive engines, and other purposes—July 8th.

To James Chesterham, for improvements on machines or apparatus for measuring land, and other purposes—July 14th.

To George Straker, for an improvement in ships' windlasses—July 25th.

To Louis Quetin, for a new or improved vehicle, for the carriage of passengers or goods—July 25th.

To Francis H. N. Drake, Esq. for improvements in tiles for houses and other buildings—July 25th.

To John Nicholls, for improvements in the lever, and the application of its power—July 25th.

To Joshua Bates, for an improved method of constructing steam boilers.—August 1st.

To Joshua Bates, for a new process of whitening sugars.—August 1st.

To John Hutchinson, for improvements in machinery for spinning cotton, &c.—July 30th.

To Nathaniel Jocelyn, of Newhaven, Connecticut, for improvements in the manufacture of blank forms for bankers' checks, &c. to prevent forgery—August 3d.

To Thomas Baily, for improvements in machinery for making lace.—August 5th.

To Thomas Brown, for an improved coach.—August 5th.

To William Shand, for improvements in distillation—Aug. 10th.

To John Mac Leod, for improvements in preparing barilla—August 10th.

To James Rowland, and Charles Mac Millan, for an improved process of constructing street ways, &c.—August 11th.

To Thomas H. Rolfe for improvements upon the self acting piano forte—August 11th.

To Edward Weeks, for improvements in raising fluids to various distances—August 14th.

To Henry C. Price, and Charles F. Price, for an improvement in apparatus for communicating heat—August 20th.

To John Mushet, for a certain medicine for gouty affections of the stomach, spasms, &c.—August 20th.

To John Jones, for improvements in machinery for dressing woollen cloths—August 21st.

To William Roger, for improvements in the construction of anchors—August 21st.

To G. H. Manton, for an improvement in the construction of locks for fire arms—September 2nd.

To J. Tucker, for certain improvements in the construction of cannon—September 9th.

To T. S. Brandreth, of Liverpool, for a new method or methods of applying animal power to machinery—September 9th.

To J. A. Fonzi, Esq. for certain improvements on, or additions to, fire places—September 9th.

To J. Soames, Jun. for a new preparation or manufacture of a certain material produced from a vegetable substance, and the application thereof to the purposes of supplying light—September 9th.

To T. Morgan, for a new method of manufacturing or preparing iron plate—September 9th.

To R. Torrens, for certain apparatus for the purpose of communicating power and motion—September 9th.

To D. Lawrence, for certain improvements in apparatus to be applied to fowling pieces and other fire arms—September 15th.

To G. Harris, R. N. for improvements in the manufacture of ropes, cordage, canvass, &c.—September 15th.

To John Milne, for a machine or engine for dressing of stones—September 15th.

To James Atchison, for certain improvements in the concentrating and evaporating of cane juice, &c.—September 15th.

To Thomas Cobb, Esq. for certain improvements in the manufacture of paper for the hanging of rooms, &c.—September 15th.

To T. Westwood, for certain improvements in watches and time keepers, September 23d.